

From Fiber to Fashion

 **LEVEL:** Grades 4-12
SUBJECTS: Social Studies (Geography), Science, Consumer Education, Career Education, Family and Consumer Science,
SKILLS: Analyzing, brainstorming, collaborating, collecting data, comparing similarities and differences, constructing media, developing self-understanding, evaluating, generalizing, identifying, listing, observing, public speaking, recording, researching, sequencing, synthesizing, writing

MATERIALS

Encyclopedias, dictionaries, scissors, glue, magazines, newspaper clothing advertisements or clothing catalogs, photocopies of the attached **Investigating Clothing, Fibers and Fabrics, From Fiber to Fashion,** and **My Choices** sheets.

Optional, but recommended: pictures of sheep, a goat, cotton plant, silkworm and cocoon; pictures or samples of unprocessed wool and cotton, other natural and synthetic fabrics (see Agriculture in the Resources located in the Appendixes); labels in garments students are wearing. (Note: Announce in advance of the day you will be studying labels so that students can wear clothing with labels and perhaps bring additional garments with labels.)

VOCABULARY

cotton, denim, dry cleaning, fabric, fiber, Kevlar®, linen, natural fibers and fabrics, nylon, polyester, ramie, rayon, renewable and nonrenewable resources, silk, synthetic fibers and fabrics, textiles, wool, and other fabrics you wish to include

RELATED LESSONS

Tomatoes to Ketchup,
Chickens to Omelettes
Step by Step
Nail by Nail, Board by Board
Why I Buy

SUPPORTING INFORMATION

Cotton T-shirts, woolen mittens, silk shirts, angora sweaters, down-filled vests. Do you think of these as connections between people, plants and animals? All the things we wear come from natural resources and include natural fibers such as down, fur, wool, cotton, and silk. They take us from fiber to fashion, with comfort, convenience and utility along the way.

Fiber is raw material that is long, strong and pliable enough to be spun into yarns and woven into fabrics. Fabric is determined by the fiber used and the weave or knitting technique. The same weave made using a different fiber will result in different characteristics in the fabric. Nature provides many different kinds of fibers that can be made into cloth. All the fibers gathered from plants and animals are called natural fibers. They have served people well for centuries.

Natural Fibers

A variety of animals provide natural fibers for cloth. Wool comes from sheep, llama, alpaca, guanaco, and vicuña. Angora rabbits provide angora and Angora goats provide mohair. Cashmere from Kashmir goats is another well-known clothing fiber. The large white moth caterpillar commonly called the silkworm provides the finest silk. The fur from such animals as mink, beaver, muskrats, and rabbits also can be found in clothing. Although leather is not a fiber, it is widely used as a fabric. Cattle hides are the source of most leathers. (For more information about each of these natural fibers from animals, see **Fibers and Fabrics.**)

BRIEF DESCRIPTION

Students study clothing labels, research fabric production, and evaluate consumer options for their clothing.

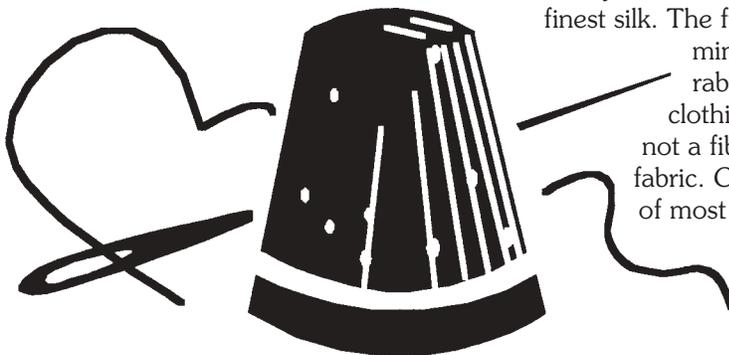
OBJECTIVES

The student will:

- identify the origins and sources of some natural and synthetic fibers;
- compare values, benefits, cost, care, and differences between natural and synthetic fibers;
- generalize connections between fabric/clothing choices and renewable or nonrenewable resources;
- identify how personal values influence decisions on the purchase of clothing; and
- identify careers associated with the clothing industry.

ESTIMATED TEACHING TIME

Session One: 45 to 60 minutes.
Session Two: 20 minutes, plus time for research.
Session Three: One hour.
Session Four: 45 minutes.



Plants also give us natural fibers for fashions. The world's most important nonfood crop is cotton. So many things are made of cotton that it would be hard to go through a day without using or wearing cotton cloth. Cotton has been found in tombs in India dating back to 3000 B.C. Linen, made from fibers of the flax plant, is one of the world's oldest fabrics. Lesser known fibers such as ramie, jute, and hemp have many uses, varying from finely woven fabrics to rope. (For more information about each of these natural fibers from plants, see **Fibers and Fabrics**.)

Synthetic Fibers

Since the late 1800s people have had other fiber options from which to choose. Called synthetic fibers, these are man-made by chemists. They fall into two broad groups depending on where the fiber originated. One group of fabrics is made from natural fiber-forming materials such as cellulose. Cellulose comes from softwoods or the short fibers sticking to cotton seeds. Rayon and acetate are cellulose-based fabrics. (See **Fibers and Fabrics** for information about rayon and acetate.)

The second group of synthetics is formed chemically from by-products of the oil-refining process. These fibers can then be woven into cloth and are often mixed with natural fibers. They are resilient, although some are easily damaged by high temperatures. Petroleum-based fabrics include Kevlar®, nylon, polyester, acrylic, polypropylene olefin, and spandex. (See **Fibers and Fabrics** for information about each of these petroleum-based fabrics.)

All fibers - natural and synthetic - have one thing in common. All are made from natural resources. Natural resources are the materials provided by nature that can be used in production. Some natural resources are renewable because those resources are replenished by natural cycles. Fibers from trees, plants and animals are from renewable natural resources. Even the synthetic fiber rayon is made from a renewable natural resource, the plant product cellulose. But not all natural resources can be regenerated or replaced naturally within a reasonable amount of time. It would take millions of years to replenish our oil and petroleum reserves. Polyester, orlon, nylon, polypropylene, and spandex are made from oil and petroleum - nonrenewable natural resources.

It takes many steps and jobs to change the fiber to a fabric used to make clothing. For example, wool is first sheared from sheep. At a warehouse, wool is sorted by type and quality before it goes to the mill. In the mill, the wool is cleaned to remove dirt and grease. When the wool is clean, it can be dyed, if desired. It is then carded to remove tangles and any remaining dirt. Carding turns the wool into long, soft strands that are then spun into yarn. Wool yarn is woven on looms or knitted into fabric before it goes to the factory. At the factory, wool fabric is processed into clothing or household goods for shipment to stores where consumers can buy the finished product.

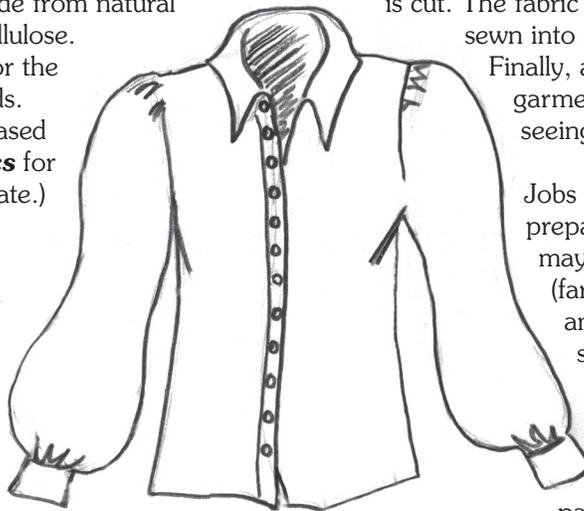
For wool or any fabric to be made into clothing, the fabric is sold to a clothing manufacturer. Clothing is designed and patterns are developed before the fabric is cut. The fabric is cut according to the pattern, sewn into a garment, and sold to stores.

Finally, as the consumer, you buy the garment at the store - often after seeing some advertising.

Jobs involved in producing and preparing clothing for the consumer may include agricultural producers (farmers and ranchers), plant and animal scientists, veterinarians, shearers, wool buyers, sorters, classers, carders, spinners, dyers, weavers, knitters, fabric designers, fabric buyers, clothes designers, pattern makers, seamstresses and tailors, store clothing buyers, advertising writers and artists, models and photographers, truckers, store stock people, salesclerks, and more.

Fabrics all offer different values, benefits, costs, and care requirements. Washing and drying are the usual ways we care for our clothing, but many fabrics require dry cleaning. Dry cleaning is done through a professional shop outside of the home. It varies greatly in cost per item. This process cleans the fabric with nonaqueous (no water) organic solvents - the reason it's called dry cleaning. With a few exceptions, natural fibers such as cotton and jute cost more and require more specialized care than synthetic fabrics. Many people are willing to invest the time and effort because they believe the comfort, beauty and other qualities of natural fibers are superior.

Clothes, blankets, curtains, carpets, and coverings - all are made from textiles that are made by spinning and weaving natural or synthetic fibers. And of all things



made from textiles, clothes are the most important. In colder climates, clothing is not only important for comfort, but necessary for survival. To many people, clothes and fashions are a way of expressing individuality. And, there is not any question that the journey from resources to you involves many jobs, businesses and industries throughout the world. The story of the clothes we wear - from fiber to fashion - is worth weaving with your students.

GETTING STARTED

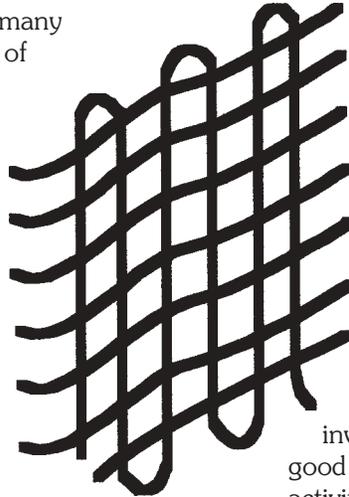
Photocopy the *Investigating Clothing, From Fiber to Fashion*, and *My Choices* sheets for each student. Photocopy and cut apart the *Fibers and Fabrics* cards for Session Two.

The day before you begin the lesson, ask students to wear clothing and garments with labels that are easy to find and read for the activity they will be doing. Consider bringing (or ask students to bring) additional garments with labels. **Optional:** Bring in a suitcase filled with clothing made from a wide selection of fabrics.

PROCEDURE

SESSION ONE

1. Predict the source of clothing. Ask:
 - From what kinds of cloth do you think your clothes are made?
 - How can you find out what kind of cloth is used in your clothing? (*Labels, appearance, and feel.*)
 - Where do you think cloth comes from? (Answers will vary; some students may suggest types of plants or animals or say man-made fabrics.)
2. Check out labels. Tell students that today they are going to check out their clothing using observation skills and labels. If you have brought any additional garments with labels, point them out at this time. Explain that reading the labels and tags in our clothing can help us to identify what they are made from, where they came from, how to care for them, and more. Assess students' knowledge about renewable and nonrenewable natural resources. Define the terms for them, if necessary, and relate the terminology to fabrics (see Supporting Information).



3. Distribute the *Investigating Clothing* sheet to individual students. Tell students they will check out their own and each other's clothing - or the clothing from the suitcase - and record their findings on the sheet. Explain that as they explore the clothing's appearance, feel and labels, they are to identify the type of fabric, the country where the clothing was made, care instructions, source of the fiber (natural or synthetic), and the type of natural resource (renewable or nonrenewable) from which the fiber comes. Explain that they may not be able to fill in all the boxes until after the discussion in Session Three following their investigation. Remind them that labels are a good source of information. Allow time for the activity. Have students save their *Investigating Clothing* sheet for Session Three.

4. Discuss the various fabrics students discovered in their clothing. Use the questions below to create a summary chart in a visible place. You may need to add some fabrics the students did not discover in class. Ask:
 - What kinds of fabrics did you discover? (List fabric types and care on your summary chart. Identify resource base and whether renewable or nonrenewable, using this opportunity for discussion and sharing of Supporting Information.)
 - What fabrics seem the hardest to take care of? (*Some of the natural fibers such as linen, wool, and ramie.*) The easiest? (*synthetics*) What generalizations can you make about fabric care? (*In general, some of the natural fibers require the most care.*) What kind of care do your favorite clothes require? (*Answers may vary from washing and drying and ironing to a lot of care.*)
 - Which types of fabrics do you like best for sports? Why? (*Encourage students to name the properties: flexible, absorbent, washable.*) For swimming? (*Light, stretchy, fast drying.*) For winter? (*Fluffy, wind resistant, warm.*) For summer? (*Light, airy, cool, washable.*) For your shoes? (*Sturdy, breathable, waterproof, durable, and more.*)
 - Which fabrics are cool? (*Natural fibers that "breathe" or are loosely woven. Light colors don't absorb the sun's heat the way dark colors do.*)

- What kinds of fabric are made from renewable natural resources? (*Wool, cotton, linen, jute, silk, ramie, rayon, and more.*)
- What kinds of fabrics are made from nonrenewable natural resources? (*Polyester, nylon, orlon, and more.*) From what are they made? (*They are made from fibers that are chemically changed or produced from petroleum-based materials. See Supporting Information.*)
- Where were the clothes you're wearing today made?
- What can you learn from reading the labels in your clothes? (*Fiber content, care instructions, where the garment is made.*)
- Why is it important to read the label before buying clothing?

SESSION TWO

Have students, working in pairs or small groups, choose one natural or one synthetic fabric. Students can choose one of the cards from the **Fibers and Fabrics** to get started or they can research another fabric of their choosing (e.g., Velcro, Naugahyde, camel's hair, cotton corduroy, cotton denim, and more). Next, distribute the **From Fiber to Fashion** sheet to each pair or group. Explain that they will do research to determine what fibers are used to make the fabric, in which countries the fibers are grown or manufactured, the advantages and disadvantages of the fabric, and the steps and types of jobs necessary for the preparation of their fiber until it reaches the consumer as clothing. Ask students to include information about which fibers come from renewable and which come from nonrenewable resources and discuss the importance of this finding. Fiber-to-clothing information is available in most encyclopedias or may be researched via the Internet. Allow students time to complete their research and prepare their presentation.

Optional for younger students

Complete the **From Fiber to Fashion** sheet as a whole group activity. Choose at least one natural and one synthetic fabric. Share the appropriate paragraphs from **Fibers and Fabrics**.

SESSION THREE

Once the pairs or groups complete their research, have them share the information with the class using the board, poster, flip-chart paper or overhead projector. Have students complete missing information from their **Investigating Clothing** sheet (Session One) after

each group completes their presentation. **Optional:** As each group presents its information, create a class chart that lists the advantages and disadvantages of each fabric.

Have students compare the similarities and differences between the origin, steps, and types of jobs for each fabric. Ask:

- What are some ways in which we can classify fibers? (Guide students to think about renewable and nonrenewable resource origins; natural fibers from plants, natural fibers from animals, man-made from nonrenewable resources, man-made from renewable resources, and more.)
- What processing steps are common among the fabrics researched?
- How do steps involved affect cost and availability of the fabric or finished goods? (*For example, silk is labor intensive, so more expensive. Ramie is difficult to free from the gum, so not as abundantly available commercially.*)
- What fabrics will keep you warm in cold weather? Cool in warm weather? What gives the fabrics those qualities?
- How are cloth and clothes related to natural resources? (*They all are made from natural resources, whether natural or synthetic fibers.*)
- How important is it to you if your clothes are made from one natural resource or another? Explain your answer.
- Why do we import clothes manufactured outside of the United States? How might this affect the cost? The quality?

SESSION FOUR

1. Build consumer awareness by brainstorming to generate a list of things to consider before buying clothes. The list might include cost, durability or strength of fabric, care needed to keep the clothing neat and clean, season in which the clothing will be worn, kinds of activities for which the clothes will be worn, and more. Challenge them then to a "Smart Shoppers" quiz.

- What fabrics are best for sports activities? For play? Why?
- Which clothes will show dirt most easily - dark or light?

- What does “Dry-Clean Only” mean on a label? What is dry cleaning? How much does dry-cleaning cost? How much does machine washing cost? Hand washing? Will clothes that must be dry-cleaned cost more to keep clean than those that can be washed? Why or why not?
 - Which clothes are usually most expensive - those made from synthetics or those made from natural fibers? *(It can vary. Other factors such as designer names make a difference. Usually, natural fibers such as wool and silk cost more than synthetics. But cotton, a natural fabric, is usually reasonably priced.)*
 - What factors do you think make a difference in the price of clothes? *(Whether manufactured inside or outside of the United States, fabrics used, whether it carries a designer label, store where it is sold, and so on.)*
 - What does it mean for clothes to have a “designer label”? Why might some people think it’s important for clothes to have a “designer label”? How does this add to the cost?
 - How does advertising affect our buying choices? The cost?
 - How do smart shoppers save money when they buy clothes?
2. Divide students into teams of four to five. Teams have five minutes to list ways they can cut the cost of buying or obtaining their clothing. Then make a master list in a visible place by going to each team in turn, asking them to contribute one item on their list to the class list. As an item is named, all teams having that item on their lists cross it off. Give special recognition for creativity to the team having the most items left on their list after all items in common have been crossed off.
 3. Build personal awareness by having students consider how personal values affect the clothes they buy. Distribute copies of **My Choices** to individual students. Explain that they complete Part I independently. Then they meet again in their original pairs or small groups to generate the responses to Part II. Invite groups to report their responses from the sheets in a class sharing and discussion time.

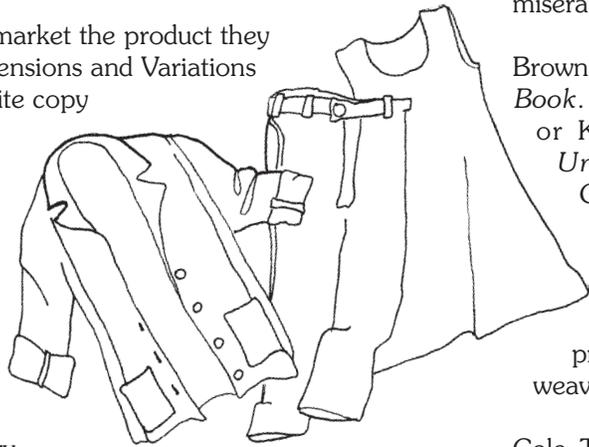
EVALUATION OPTIONS

1. Have students create a Venn diagram and/or explain in writing three differences between natural and synthetic fabrics and tell the sources of at least five fibers (wool, cotton, nylon, silk, rayon, and so on). See the **Venn Diagram #1** in the Appendixes for information.
2. Bring a variety of clothes into the classroom packed in a suitcase or similar container. Hold them out one at a time. Students will:
 - identify the fabric,
 - estimate the cost of the item,
 - tell the care the garment might require, and
 - tell if and why the fabric is a good choice for that garment based on how it is used.
3. Have students write a paragraph demonstrating the proper meaning of renewable and nonrenewable fabrics. How are they similar and different? How is your clothing connected to renewable and nonrenewable natural resources?
4. Have students write or name eight careers involved in the clothing industry.
5. Ask students to write or draw the kinds of information one can find on clothing labels. What other kinds of information do they think could be included on the labels?

EXTENSIONS AND VARIATIONS

1. Ask students to bring to class any examples of raw fibers they can obtain, as well as various types of fabrics and textiles. Ask them to staple a sample of the fiber or fabric on an index card together with its name, what qualities the fabric or fiber is known for (warmth, ability to take dyes well, stretchiness, comfort in hot weather, easy care, and more), resource base, and other information they find interesting. Make a bulletin board with the cards.
2. Invite a clothing salesperson or buyer to visit the classroom to bring labels and share tips for judging clothing quality and making wise clothes-buying decisions. What can these experts tell students about reading labels? What codes are on the labels the store attaches to garments (besides sale price)? When are the store’s sales? When is it a good idea to buy something “on sale”? What new fabrics are easy care and “cool”? Consider asking students to prepare their questions and send them to the speaker in advance.

3. Have students imagine and draw what the plant or animal source of these fabrics or weaves could look like: corduroy, gingham, houndstooth, herringbone, seersucker, burlap, and more. Then visit a fabric store or examine fabric samples to learn about the actual source and appearance.
4. Challenge students to design a garment or outfit they would choose for themselves, if possibilities were limitless. When selecting the material, they should consider the values that are important to them and what kind of time, expense, and care they are or are not willing to invest. When designing the garment, they should consider how often, for what use or effect, and where they will wear it. Have students design a logo/personal label for their line of clothing. Imaginations are great solution finders in this activity. Invite volunteers to “show and tell” for the group, sharing their fashion solutions - real or invented.
5. Have students market the product they designed in Extensions and Variations 4. They can write copy for a print ad, write a commercial jingle for a radio ad, or produce a TV commercial.
6. Research the history of the garment industry in the United States and its relationship to labor unions and child-labor laws. What is a sweatshop? Why are some clothing companies moving their manufacturing plants outside of the United States? What feelings do people have about their clothing being made at the expense of child labor, with little regard for the environment, or by poorly paid workers? (See book titles in Extensions and Variations 8.)
7. Have students research other plants, animals or synthetic fibers not included in the Supporting Information. For example, buffalo hair has been used to make coats, vests and blankets.
8. Have the students read some of the following books. These literature selections offer students multicultural perspectives, social insights, and valuable information of fibers, fashions, and people. Have students discuss, debate, or present what they learned to the class.



Alter, Judith. *Eli Whitney*. Watts Franklin. 1990. ISBN: 0531108759 or Gaines, Ann Graham. *Eli Whitney*. Rourke Publishing, LLC. 2001. ISBN: 1589521773 or Latham, Jean Lee and Louis Cary. *Eli Whitney Great Inventor*. Main Line Book Company. 1991. ISBN: 0791014533 or Green, Constance McLaughlin. *Eli Whitney and the Birth of American Technology*. Addison Wesley Longman, Inc. 1999. ISBN: 0673393380. Any of these are biographies discuss Eli Whitney’s major influence in the development of industry. The invention of the cotton gin and application of standardized parts to the production of weapons and other machines stimulated the industrial revolution in the United States.

Bader, Bonnie. *East Side Story*. Silver Moon Press. 1997. ISBN: 1881889718. A young girl and her older sister, working in the Triangle Shirtwaist factory (an early 20th century sweatshop on the Lower East Side of New York City), join a protest to improve their miserable working conditions.

Brown, Rachel. *The Weaving, Spinning, and Dyeing Book*. Alfred A. Knopf. 1983. ISBN: 0394715950 or Keeler, Patricia and Francis X. McCall. *Unraveling Fibers*. Macmillan Publishing Company, Inc. 1995. ISBN: 0689317778 or Stoppelman, Monica and Carol Crowe-Carraco. *Fabric*. Crabtree Publishing Company. 1998. ISBN: 0865057893. Each of these books explores the process of producing fibers, spinning fiber into yarn, and weaving that yarn into fabric.

Cole, Trish. *Why Do We Wear That?* Franklin Watts. 1996. ISBN: 0531143961 or Perl, Lila. *From Top Hats to Baseball Caps, From Bustles to Blue Jeans: Why We Dress the Way We Do*. Houghton Mifflin Company. 1993. ISBN: 0899199720. The types of clothing people have worn throughout history, why they dressed the way they did, and how clothing reflects and even influences history are discussed in both of these books.

Currie, Stephen. *We Have Marched Together: The Working Children’s Crusade*. Lerner Publishing Group. 1999. ISBN: 0822517337 or Freedman, Russell. *Kids at Work: Lewis Hines and the Crusade Against Child Labor*. Demco Media. 1998. ISBN: 0606135510. The crusade to end child labor is explored in these texts. Photos by Hines convinced people that the United States needed laws against child labor.

Grimes, Nikki. *Aneesa Lee and the Weaver’s Gift*. HarperCollins Children’s Books. 1999. ISBN: 0688159974 or Roessel, Monty. *Songs from the*

Loom: A Navajo Girl Learns to Weave. The Lerner Publishing Group. 1995. ISBN: 0822597128 or Sola, Michele and Jeffery Jay Foxx. *Angela Weaves a Dream: The Story of a Young Maya Artist.* Hyperion Books for Children. 1997. ISBN: 0786820608. Cultural aspects of making fabric are explored in these three explorations as each girl learns to produce fabric.

Paterson, Katherine. *Lyddie.* Penguin Putnam Books for Young Readers. 1994. ISBN: 0140373896. An impoverished farm girl, Lyddie Worthen, is determined to gain her independence by becoming a factory worker in Lowell, Massachusetts in the 1840s.

Weidt, Maryann. *Mr. Blue Jeans.* Lerner Publishing Group. Reprint Edition 1992. ISBN: 0876145888 or the Lerner Publishing Edition of the same book. 1991. ISBN: 0876144210. The life of Levi Strauss is traced in this story of the Jewish immigrant peddler who went on to found Levi Strauss & Co., the world's first and largest manufacturer of denim jeans.

9. Sing the following song with students to reinforce the lesson concepts.

NATURAL FIBERS

Song Tune: "Mary Had A Little Lamb"

Lyrics used with permission from
Beverly Bruns, Victoria, Texas

Na-tural fi-bers come from plants
come from plants
come from plants
Na-tural fi-bers come from plants
And from an-i-mals too!

Cot-ton flax jute and Ram-ie
are a few
are a few

Cot-ton flax jute and Ram-ie
Are grown to make some cloth.

Cash-mer-e mo-hair silk and wool
are a few
are a few

Cash-mer-e mo-hair silk and wool
are hair made in-to cloth.

Plants and an-i-mals give us cloth
give us cloth
give us cloth

Plants and an-i-mals give us cloth
cloth that's Na-ture's Gift.

ADDITIONAL RESOURCES

Britton, Karen Gerhardt. *Bale O' Cotton: The Mechanical Art of Cotton Ginning, Vol 43.* Texas A & M University Press. 1992. ISBN: 0890965102.

Duvall, Jill. *Ms. Moja Makes Beautiful Clothes.* Children's Press. 1997. ISBN: 0516203142.

Hargrave, Harriet. *From Fiber to Fabric.* C & T Publishing. 1997. ISBN: 1571200258.

Healy-Johnson, Guinevere and Nancy Shaw. *Wool.* The Creative Company. 1999. ISBN: 0886829658.

Heinrich, Linda. *Magic of Linen: Flax Seed to Woven Cloth.* Orca Book Publishers. ISBN: 0920501672.

Johnson, Sylvia. *Silkworms.* First Avenue Editions. 1989. ISBN: 0822595575.

Kalman, Bobbie. *Hooray for Sheep Farming!* Crabtree Publishers. 1997. ISBN: 0865056552.

Kite, Patricia. *Silkworms.* LPK Science. 1997. ISBN: 1575025426.

L'Hommedieu, Arthur John. *From Plant to Blue Jeans: A Photo Essay.* Children's Press. 1998. ISBN: 0516203665.

Learning About Linen. The Linen House.
<http://www.thelinenhouse.com/learninglinen.asp>

Mandleburg, Hilary. *The Essence of Wool.* Ryland Peters & Small, Incorporated. 2001. ISBN: 1841721913.

Mohair Council of America. 233 Twohig, P.O. Box 5337, San Angelo, TX 76902. (915) 655-3161.
<http://www.mohair.com>

Morris, Ann. *Hats, Hats, Hats.* Mulberry Books. 1998. ISBN: 0688122744.

Morris, Ann. *Shoes, Shoes, Shoes.* Mulberry Books. 1998. ISBN: 0688161669.

National Cotton Council of America. 1918 N Parkway, Memphis, TN 38112. (901) 274-9030.
<http://www.cotton.org>

Natural Fiber Research and Information Center, University of Texas at Austin, P.O. Box 8180, University Station, Austin, TX 78712. (512) 471-1616.
<http://www.utexas.edu/depts/bbr/natfiber/>

Parker, Julie. *All About Cotton: A Fabric Dictionary and Swatchbook*. Rain City Publishing. 1998. ISBN: 0963761234.

Parker, Julie. *All About Wool: A Fabric Dictionary and Swatchbook*. Rain City Publishing. 1996. ISBN: 0963761226.

Parker, Julie. *All About Silk: A Fabric Dictionary and Swatchbook*. Rain City Publishing. 1992. ISBN: 096376120X.

Riquier, Aline. *The Cotton in Your T-Shirt*. Forest House Publishing Company, Incorporated. 1993. ISBN: 1566740584.

Sanders, Scott Russel. *Warm As Wool*. Simon & Schuster. 1998. ISBN: 0689822421.

Selsam, Millicent. *Cotton*. William Morrow & Company. 1982. ISBN: 0688014992.

Shaw, Nancy. *Cotton*. The Creative Company. 1999. ISBN: 0886829593.

The Wool Bureau, Inc., 330 Madison Avenue, New York, NY 10017. (212) 986-6222.

Woodbridge, Renu Nagrath. *Cotton*. Garrett Educational Corporation. 1994. ISBN: 1560740582.

World Cotton Database. EconCentral. National Cotton Council. <http://www.econcentral.org>

REFERENCE

Smith, C. Wayne and Joe Tom Cothren (editors). *Cotton: Origin, History, Technology and Production*. 1999. John Wiley & Sons. ISBN: 0471180459.

WEB SITES

About Silk. 2002. <http://www.jjexporters.com/divers.htm>

American Wool Council. 2002. <http://www.sheepusa.org/wool/index.html>

American Sheep Industry Association, Inc. 2002. <http://www.sheepusa>

From Flower to Textile, The Story of Linen. http://www.libeco.be/eng/business/mn_pros.htm

Glossary of Terms Related to Silk. 2002. <http://silkery.com/terms.html>

The Invention of Silk. 2002. <http://silkery.com/invent.html>

Irish Linen Guild. 2002. <http://www.irishlinen.co.uk>

Learning About Wool. Kids-Learning About Wool. American Sheep Industry Association, Inc. 2002. <http://www.sheepusa.org/kidswool/htm>

The Linen House. 2002. <http://www.thelinenhouse.com/learninglinen.asp>

The National Angora Rabbit Breeders Club. 2002. <http://narbc.tripod.com>

National Cotton Council of America. 2002. <http://www.cotton.org>

Sheep in America. American Sheep Industry Association, Inc. 2002. <http://www.sheepusa.org/sheepusa.htm>

World Cotton Database. 2002. <http://www.econcentral.org>

Llamapaedia: The Growing Source for Llama Information. 2002. <http://www.llamapaedia.com>

EDUCATOR'S NOTES

FIBERS AND FABRICS

(Cut cards apart.)

Natural fibers from animals



Wool cloth is spun from yarn made from the fibers in the thick, spongy fleece of a sheep. Sheep's wool comes in shades of black, white and brown, and there are many different breeds of sheep. (Generally, only hand spinners keep, raise and shear colored sheep. Commercial wool producers discriminate against all but white sheep. Only white fleece can be dyed.) Once a year sheep are brought to the barn to have their fleece cut off or sheared. In five minutes the job is done and the sheared sheep are racing back to the field. Just like anyone's haircut, the sheep's hair grows back and needs cutting again. In the meantime, people put the valuable fibers to good use, spinning and weaving them into warm, absorbent, lightweight or heavy, beautifully dyed wool garments and more. All animal hair commonly used to make cloth is covered with scales and sucks up moisture. But the wool fibers from sheep can hold more water away from your skin than any other kind. When wearing a wool sweater, you feel warmer because your skin stays drier.



The **llama**, **alpaca**, **guanaco**, and **vicuña**, all animals of the Andes region of South America, grow hair or fur coats of fiber that is woven into cloth. They are related to the camel, but are smaller and have no hump. People of the Andes cut the fleece from these animals with large scissors. In other places it is gathered by brushing or shearing off the fibers with electric clippers. These animal-hair fibers, usually brown and occasionally black or white, are used for knitwear and for woven fabrics. Alpaca wool is of a higher quality than llama wool and is straighter and finer than sheep's wool. Llama and alpaca fibers are very thick and have hollow centers. The hollow fibers help keep bulky llama and alpaca clothes from feeling heavy and make warm clothing. Because of their warmth, these fibers are often made into outerwear such as sweaters, hats, scarves, and coats.

Angora rabbits provide some of the finest, lightest, and warmest of all fibers. They are named after a place in Turkey, where they came from hundreds of years ago. Today most Angora rabbits are raised in China and France. An Angora rabbit's hair is removed a little at a time, then spun into yarn and woven into fabric. One reason why angora is so warm is because it is so fluffy. The fluff leaves air spaces between the fibers that trap and hold in the warmth of your body.

The Angora goat is another fiber provider. The white hair of Angora goats is called **mohair**. Mohair was produced exclusively in Turkey for thousands of years. Most of the Angora goats in the United States live on ranches in the hills of western Texas, where they thrive on the shrubs and grasses growing there. An Angora goat's mohair grows an inch each month. Most Angora goats are sheared twice a year; otherwise their locks would be too long for spinning mills to work with. Mohair is used in all the same ways as wool, but it is softer than wool and some people feel it is more comfortable to wear against the skin. As Angora goats grow older, their fibers get rougher. These coarser fibers are used to make carpets and upholstery.

Cashmere from Kashmir goats, of northwest India/northeast Pakistan, is a well-known clothing fiber. It is used to make garments such as sweaters, dresses and scarves. Cashmere fabrics are luxurious in appearance, very soft, and provide warmth without weight.

Silk is produced mostly by moth caterpillars in building their cocoons, but the finest silk comes from the large white moth caterpillar commonly called the silkworm. The silkworm's cocoon, built with long, continuous fibers, is unwound to produce the fine threads used to weave silk cloth. Silkworms take a lot of care, and it takes many cocoons to make a significant amount of silk thread. This makes it expensive, but people prize silk for its smooth, shiny texture, its strength and light weight, and its ability to be dyed in an array of colors.

Fur is the soft, thick, hairy coat or the haired skin of a mammal. Most furbearers of commercial value (mink, beavers, muskrats, rabbits) have an undercoat of short, soft hairs (called fur fiber) and an outer coat of longer, smoother, stiffer hairs (called hair covering). Any article of wearing apparel that is made partly or entirely with fur is called a fur product. Furlike fabrics ("fake furs") are made from a combination of natural and synthetic fibers.

Although **leather** is not a fiber, it is widely used as a fabric. Cattle hides are the source of most leathers; deer, goat, pig, and sheep skins are also widely used. Leather is strong and durable and can be made as flexible as cloth or as stiff as wood. Because of this versatility it is used to make a wide variety of items including shoes, boots, belts, gloves, jackets, hats, shirts, slacks, purses, and saddles. Baseballs and footballs have a leather covering. The United States is one of the largest producers of leather today.

FIBERS AND FABRICS (page 2)

(Cut cards apart.)

Natural fibers from plants



Cotton grows best where it stays warm and sunny for at least half the year. The United States is second only to China in raising cotton. Cotton is the number one commodity grown in Louisiana; second in Arizona, Texas, and Mississippi; third in Georgia and Tennessee; fourth in Alabama and Arkansas; and fifth in California and South Carolina. The fruit of the cotton plant is called a boll. Inside the boll, moist cotton fibers form around the 20 to 30 cottonseeds. When the fruit is ripe, the boll bursts open to show the cotton. After harvesting, cotton gins separate the cotton from the seeds and clean, dry, and bundle the fiber into heavy bales for shipment to mills. Here it is spun into yarn and woven or knit into cloth. More things are made of cotton than of any other fiber. Why? It costs less to harvest cotton fibers than most other fibers that are used to make cloth. Cotton is also absorbent, soft, lightweight, stretchy, and fast drying.

Linen, made from fibers of the flax plant, is another textile made from natural fibers. China, Belgium, and Ireland are big growers of flax. Linen is one of the world's oldest fabrics. Pieces of linen from Egypt indicate that people living there about 5000 B.C. wove fibers from the flax plant. Archaeologists have found Egyptian mummies, dating from the 2500s B.C., wrapped in linen. Because its fibers are so smooth and slick, linen does not shed much lint. For that reason, linen makes good dish towels. It also is used in clothing, table cloths, lace, twine, bags, and fire hoses. Linen retains its shape and is resistant to heat, moths and perspiration.



Jute is a natural plant fiber that has been grown in India since ancient times. Jute is used in burlap sacks, bags and carpet pads. It comes to us from the jute fibers harvested in the moist heat of Bangladesh, India and China. The long fibers are sent to a mill via truck, boat or oxcart. At the mill the jute fibers are made into cloth or rope. Jute fibers are plentiful and cheap. If you have not heard of jute before, perhaps it's because jute is made into things that are for usefulness rather than beauty.

Ramie (RAY me) is an ancient fiber-bearing plant that has been holding promise, but challenging people for centuries. Ramie fibers come from China grass. The raw fiber is coated with gum that must be removed. For ages, removing the gum without damaging the fiber has been the bottleneck for using ramie. Degumming methods vary, but generally require several steps, subjecting the fibers to heat, chemicals, crushing, washing, and drying. The ramie plant has more uses than the other fiber plants, and is reportedly twice as strong as flax and seven times as strong as wool, so experts are working hard for a solution. There are several reasons why some say ramie may be the crop of the future: sources of supply of the materials (cellulose and petroleum) for rayon and other synthetics are being gradually used up; land planted in cotton is on the decrease; supply of linen fabrics is not keeping up with demand; and our increasing dependence on foreign countries for wool. Ramie produces finely woven fabrics. It also is used to make rope, and it's said that the Bank of France even used it for banknotes of superior quality. Because of its fineness, luster, durability, and strength, the demand for ramie is great. It blends well with fibers such as cotton, wool, linen, silk, rayon, and others. It can be spun and woven on the same equipment, thus adding to the beauty and value of those fabrics. Still, to grow and prepare ramie for spinners remains the challenge. It will be a while before ramie can be produced in large commercial amounts. For now, Florida-grown ramie is second to none, and its cultivation and harvest is being studied by scientists.

The **hemp** plant is grown for its strong, durable fiber. The plant's slender woody stalks are hollow except at the top and base. Hemp fibers come from the inner bark of the stalk and are used to make ropes, cords, string, twines, and coarse fabrics such as sacking and canvas. In Italy, it is used to make a fabric similar to linen. Hemp was cultivated in China as early as 2800 B.C. It is native to central and western Asia and was once grown in many temperate and tropical regions worldwide. The plant became less important after development of synthetic fibers as strong as or stronger than hemp fibers. Hemp is still grown for its fiber in some countries. Because two illegal drugs can be obtained from hemp plants, cultivation in the United States requires a government permit.

FIBERS AND FABRICS (page 3)

(Cut cards apart.)



Synthetic fibers

Rayon, originally called artificial silk or poor-man's silk, was an attempt in the late 1800s to produce silk chemically. It was first commercially produced in the United States in 1910. The name changed from artificial silk to rayon in 1924; the word *ray* indicating the sheen (bright, shiny) of the fiber and *on* indicating a cottonlike fiber. Rayon can be found in dresses, suits and lingerie. Because of its strength and durability, it is also used in automobile tire cords, upholstery, and scatter rugs.

Acetate fiber (also called cellulose acetate) was first produced in large quantities in 1921. It feels softer than rayon, but is not as strong or as absorbent.

Kevlar® is a strong, heat resistant, chemically-formed synthetic fiber. Many firefighters wear coats containing Kevlar® to protect them from high temperatures during firefighting. Race-car drivers wear jumpsuits made with Kevlar® to protect them in case of fiery crashes. And police officers often wear bullet-resistant vests lined with layers of tough Kevlar® cloth.



Nylon is the synthetic fiber produced in the largest quantities and is probably the most versatile of all the synthetics. It was first produced commercially in large quantities in 1939-1940. Nylon is very strong, can withstand abrasion, and keeps its shape. It is used in fabrics designed for nearly all kinds of apparel, furnishings, and industrial purposes. Wash-and-wear fabrics made with nylon or other synthetic fibers dry faster than those made with natural or cellulose-based synthetic fibers (rayon, acetate). Nylon is resistant to mildew, moths and perspiration.

One of the most important and widely produced **polyesters** is polyethylene terephthalate (PETE). It can be spun into fiber, made into film, or combined with other materials and molded into plastic parts. PETE is probably best known for its use in plastics, but it also can be found in clothing and automobile tire cords. Polyester fibers include Dacron®, Fortrel, and Kodel. Polyesters are extremely strong and durable and are popular in apparel fabrics, soft carpets, and industrial fabrics. Clothing fabrics are often made from a blend of polyester and cotton fibers. The polyester fibers provide the wash-and-wear quality and the cotton fabric makes them comfortable to wear. Polyester is resistant to abrasion, wrinkling, sunlight, mildew, moths, and perspiration.

Acrylic fibers possess a unique woollike feel. They are very strong and show little damage from sunlight and many chemicals. They can be found in dresses, suits, sweaters, blankets, carpets, and fur-like fabrics. Orlon is an acrylic fiber and is soft and durable.

Polypropylene olefin fibers are the lightest weight of all synthetic fibers. They are strong and resist stains (fibers absorb almost no moisture) and are used in carpets, upholstery, and ropes. Their use in clothing is limited by poor dyeability and low melting temperature. Polypropylene retains its shape and is resistant to abrasion, chemicals, and mildew.

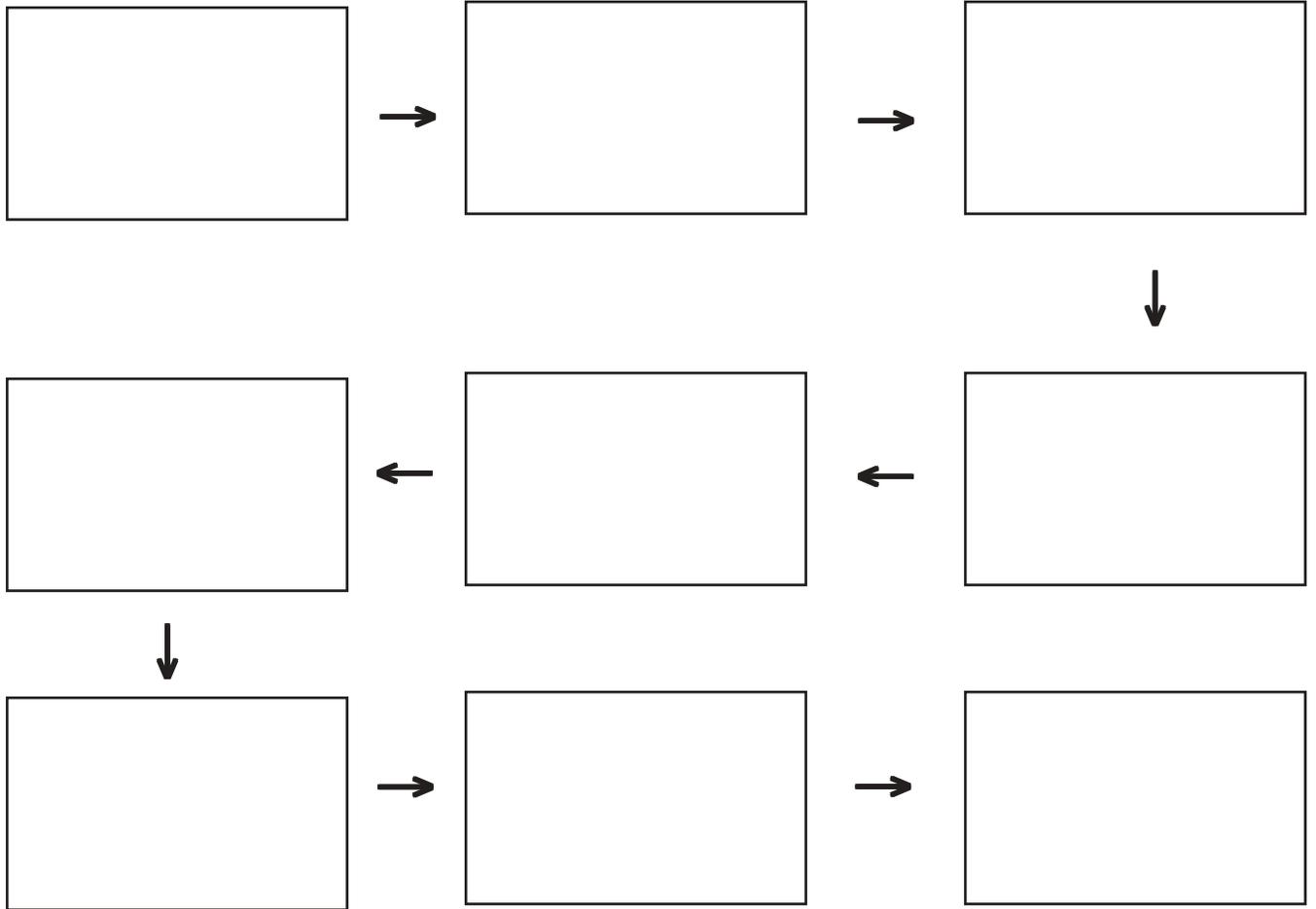
Spandex fibers are resistant to body oils and they keep their elasticity after repeated washings. These synthetic fibers are used in foundation garments, bathing suits, and support stockings.

FROM FIBER TO FASHION

Name: _____

Directions: Draw or use words to show the steps and jobs needed to make a fiber into clothing. Use and/or add as many boxes as you need.

FIBER: _____



Write all the jobs identified from the above steps on these lines.

- | | | |
|----------|-----------|-----------|
| 1. _____ | 7. _____ | 13. _____ |
| 2. _____ | 8. _____ | 14. _____ |
| 3. _____ | 9. _____ | 15. _____ |
| 4. _____ | 10. _____ | 16. _____ |
| 5. _____ | 11. _____ | 17. _____ |
| 6. _____ | 12. _____ | 18. _____ |

MY CHOICES

Name: _____

I. Directions: Read each statement and check your response in the appropriate box.

Statement	Yes	Sometimes	No	Not Sure
1. Clothes with designer labels are important to me even though they cost more.				
2. I know clothes that have to be dry-cleaned will cost extra money, but I am willing to pay the difference.				
3. I feel that discount and outlet stores are good places to shop for clothes.				
4. I prefer to buy such natural fabrics as cotton and wool because they are from renewable resources.				
5. It is important to me to have the most current fashions.				
6. Shopping at a secondhand store is okay because it's a good way to save money.				
7. When I buy something I wear over and over again, it's okay to spend more money if it means higher quality.				
8. If something is made better and will last longer, I am willing to pay more for it.				
9. Shopping carefully to get a good value at less money is worth it because it gives me more money to spend on something else.				

II. Directions: Complete these statements in your small group. All groups should be prepared to share their responses with the class.

1. Three ways in which understanding my values about clothing can help me make better buying decisions are:

1. _____

2. _____

3. _____

2. Times when paying more for something makes good sense are:

3. Times when paying less for something makes good sense are: