Finishes

Unit: Science of Textiles and Manufacturing

Problem Area: Fabric Construction

Lesson: Finishes

Student Learning Objectives.

Instruction in this lesson should result in students achieving the following objectives:

1. **Identify performance finishes.**
2. **Identify aesthetic finishes.**

Resources.

The following resources may be useful in teaching this lesson:

Collier, Billie J., Martin Bide, and Phyllis G. Tortora. *Understanding Textiles*, 7th ed. Pearson Prentice Hall, 2009.

Kadolph, Sara J. *Textiles: Basics*, 10th ed. Pearson Prentice Hall, 2007.

Liddell, Louise A., and Carolee S. Samuels. *Apparel: Design, Textiles, & Construction,* 10th ed. Goodheart-Willcox, 2012.

Yatuzis, Rachael. "How to Stone Wash Jeans at Home," *eHow*. Accessed Feb. 1, 2012. http://www.ehow.com/video_4766554_stone-wash-jeans-home.html.

Equipment, Tools, Supplies, and Facilities

- ✓ Overhead or PowerPoint projector
- ✓ Visual(s) from accompanying master(s)
- ✓ Copies of sample test, lab sheet(s), and/or other items designed for duplication
- ✓ Materials listed on duplicated items
- ✓ Computers with printers and Internet access
- ✓ Classroom resource and reference materials

Key Terms.

The following terms are presented in this lesson (shown in bold italics):

- acid wash finishes
- aesthetic finishes
- antimicrobial finishes
- antistatic finishes
- calendering
- chintz finishes
- embossed finishes
- fade-resistant finishes
- finishes
- flame-resistant finishes
- flame-retardant finishes
- insect-bite-resistant finishes
- irritation-resistant finishes
- mercerization
- moiré finishes
- moisture-resistant finishes
- moth-repellant finishes
- napping
- nanotechnology
- odor-resistant finishes
- peach skin finishes
- performance finishes
- permanent press finishes
- preshrunk fabrics
- Sanforized™ fabrics
- shrinkage-control finishes
- sizing
- soil-release finishes
- stain-resistant finishes
- stone wash finishes
- suede finishes
- water-repellant finishes
- waterproof finishes
- weighting

Interest Approach.

Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

> *Write "PAFF" on the board. Tell students that PAFF stands for performance and aesthetic fabric finishes. Define finish as a process performed on fiber, yarn, or fabric after weaving or knitting to improve the look, performance, or hand (feel) of the finished textile or clothing.*

> *Then ask students to brainstorm the difference between performance finishes (a process applied to alter the functional qualities of the base fabric) and aesthetic finishes (finishes added to fabric to improve the luster, texture, drapability, and surface appearance of fabrics). Record the students' ideas on the board. Next, define the difference if students did not list the correct answer. Note that the*

average interior design fabric is treated with six finishes to be salable. Have students brainstorm all the fabric finishes they can recall, and list those on the board.

CONTENT SUMMARY AND TEACHING STRATEGIES

Objective 1: Identify performance finishes.

Anticipated Problem: What finishes are applied to fibers and fabrics to make them perform better?

I. Performance finishes

A. ***Performance finishes*** are processes applied to alter the function or performance qualities of the base fabric. Finishes can be applied to fabrics that enhance the basic performance qualities or develop performance qualities that do not inherently exist in the fabric. The ability of fabrics to perform certain functions depends on fiber type and the construction of the yarns and fabrics involved. To further improve the ability of a fabric to perform, ***finishes*** (processes applied to the fabric to improve the look, performance, or hand of the finished textile or clothing) are added during the manufacturing process to complete textiles. These finishes may be wet or dry, cold or heated types and are added in the yarn stage or after yarn has been woven or knitted. Finishes are applied to textiles and apparel chemically or mechanically and may be applied to improve performance or appearance. The longevity of finishes is a consideration when purchasing textiles. Most finishes are categorized as durable (long lasting during multiple cleanings) or non-durable (removed slowly through ongoing cleaning). Examples of performance finishes include the following:

1. ***Antistatic finishes*** are chemical inhibitors added to human-made fiber viscose solutions, or topically after the carpet or fabric is completed, to diminish the buildup of static electricity on the surface of a fabric—usually carpeting as well as wall and furniture upholstery.
   a. If the antistatic finish is added to the viscose solution, it will be durable. If added as a topical, it becomes soluble and is considered a non-durable finish.
   b. Antistatic finishes are applied to synthetic and wool textiles to reduce electric shock. To counteract an electric charge, the fibers or fabrics are coated with an antistatic substance that prevents shock to the wearer or the finish and is designed to attract moisture that increases the conductivity of electricity, thus preventing the shock. Antistatic finishes are also used on apparel.

2. ***Permanent press finishes*** (or durable press, crease-resistant, wash-and-wear, and wrinkle-free) are known as care-free finishes designed to make fabric care easier. They are applied to help resist wrinkling, creasing, etc.
   a. Permanent press finishes are applied to fabric by baking resins (formaldehyde) onto the fabric's surface.
      (1) These resins help the fabric resist wrinkling and enable manufacturers to permanently crease pants and pleat skirts.
      (2) The downside is that they weaken the fabric, and the resin in the fabric makes stains more difficult to remove.
   b. The finishes have become more durable over the years and now last the lifetime of the fabric.
   c. Permanent press finishes are used on cotton, rayon, and blends of natural and synthetic fabrics and have been especially helpful in decreasing wrinkling in cotton fabric.
   d. When drying permanent press items in a dryer, the setting needs to be set on "permanent press," and the garment should be removed immediately for the finish to work best.
3. ***Fade-resistant finishes*** are treatments that prevent fabrics from fading during laundering, dry cleaning, and sunlight exposure. Chemicals are added to dyes and pigments to prevent fading and to cause the color to remain "true" for long periods. Fade-resistant finishes are used on:
   a. Apparel fabrics
   b. Upholstery, drapery, and outdoor furniture fabrics
4. ***Flame-resistant finishes*** or ***flame-retardant finishes*** are finishes that inhibit the rate of ignition, slow the flame spread, and enhance a textile's ability to self-extinguish. These are topical applications and are heat-set into the textile.
   a. The flame-resistant qualities are the result of chemicals added to synthetic and natural fibers and fabrics during the manufacturing stage.
   b. Flame-resistant finishes cut off the oxygen supply that causes the flame to extinguish. Although flame-resistant finishes are used in children's and firefighter's apparel, the finishes wear off after many launderings.
5. ***Mercerization*** is the application of caustic soda or lye to cotton or rayon to improve luster and absorbency, increase the affinity for dye absorption, reduce shrinkage, and improve fabric strength.
6. ***Moth-repellant finishes*** are topical chemical applications for wool or cellulosic fabrics to repel moths, carpet beetles, and other insects. These finishes may be durable or non-durable. In some cases, the finish acts as an insecticide in which the fiber has been altered to repel insects. Moth-repellant finishes are primarily used in apparel and carpet textiles.
7. ***Shrinkage-control finishes*** are a preshrinking of the fabric through the application of heat and moisture. ***Preshrunk fabrics*** are items that will not shrink more than 3 percent when cleaned or laundered. ***Sanforized™ fabrics*** are fabrics that will not shrink (or gain) more than 1 percent in size when cleaned

or laundered. Shrinkage control is an important finish as it controls the fit of treated garments.

8. ***Soil-release finishes*** and ***stain-resistant finishes*** are chemical treatments to fabrics that hold dirt and oily stains on the surface of the textile for a time so they can be removed easily.
    a. Fluorochemicals, silicone, and stain-blocker compounds cause soil to bead up and roll off the fabric, making it easy to wipe off. The finish also helps detergents release soil from fabrics.
    b. The treatments are applied during manufacture or when fabric is sent to a finishing company.
    c. The topical applications from spray cans and those applied in a furniture warehouse are non-durable.
    d. Soil-release and stain-resistant finishes are used on tablecloths, carpets, upholstery, draperies, window shades, apparel, etc. Some well-known brand names are:
        (1) 3M Scotchgard™
        (2) DuPont Teflon®
9. ***Water-repellant finishes*** are treatments that protect against water damage by making textiles less hydrophilic (water absorbing). Immersing fabrics in wax, metallic soaps, or silicone baths applies the finish. Water-repellant finishes cannot resist heavy rain or long exposure to rain and are not permanent. The finishes, however, can be renewed by dry cleaners. Water-repellant finishes are usually used on tightly woven fabrics, such as those for:
    a. Umbrellas
    b. Raincoats
    c. Outdoor furniture
    d. Draperies
    e. Numerous non-residential textiles
10. ***Waterproof finishes*** are compounds that coat fabric and do not allow water to penetrate fabrics. The finish is permanent.
    a. Waterproof fabrics may stiffen in cold weather, and some fabrics are uncomfortable because they do not breathe.
    b. Membrane fabrics placed next to waterproof fabrics allow the passage of moisture vapor, making these garments more comfortable. Waterproof fabric is used in apparel for fishermen, firefighters, etc.

B. ***Nanotechnology*** is altering of the molecular atom-to-atom structure of chemicals that, when used in fabric manufacturing, improve fabric performance. The following finishes are available on fabrics as a result of nanotechnology:

1. ***Antimicrobial finishes*** (antibacterial or antiseptic) are bacteriostats—chemicals that suppress bacteria, mold, and mildew and slow or prevent the rotting process—that decrease the growth of microorganisms that can weaken fibers and cause staining and odors. A recent example is the antimicrobial finish that

inhibits the growth of mites (which cause allergic reactions) in bedding. This finish is topically applied to carpets and upholstery.

2. ***Insect-bite-resistant finishes*** are treatments that inhibit insect bites. Fabric is treated with chrysanthemum oil that resists ticks, mosquitoes, ants, flies, and chiggers. This finish is used on fabric designed for outdoor clothing worn by hunters, hikers, forest rangers, etc.
3. ***Moisture-resistant finishes*** are treatments that keep the body comfortable by pulling moisture away from the body, enabling the body to stay dry and cool or warm. In bathrooms, moisture-resistant finishes are applied to drywall to help inhibit condensation and mold growth. In cold temperatures, fibers contract; in hot temperatures, fibers expand. The finish is used on synthetics and water-resistant fabrics, such as:
   a. Cotton duck (directors' chairs and outdoor umbrellas)
   b. Canvas (outdoor marine fabrics, including boat covers and tarps)
   c. Awning fabrics
   d. Phifertex® mesh (a durable, open weave, vinyl-encapsulated mesh construction—similar to window screen—that is self-draining for boat cushions and other outdoor applications)
   e. Rip Stop™ (lightweight jackets and wind-breakers)
4. ***Odor-resistant finishes*** are treatments that prevent odors in fabrics by controlling odor-causing bacteria, mold, and mildew from forming. These treatments are used on towels, socks, and hunters' clothing.
5. ***Irritation-resistant finishes*** are treatments that prevent fabric abrasion against the skin by embedding microcapsules (e.g., aloe) in the fabric that break up and soothe the skin. For example, aloe is used in moisturizing socks. Irritation-resistant finishes are used extensively in baby diapers.

Teaching Strategy: *Construct a "Textile and Design Finishes Word Wall." Divide the Key Terms list by the number of students in class. Assign one or two terms to each student. Students should look up the definition as it relates to textiles and design, write the word and definition on a piece of construction paper, present the definition(s) to the class, and post the Key Terms and definitions on a Word Wall. All class members are then to write each definition in their notebook and write one sentence using each Key Term.*

Assign students to read the textbook entry about textile finishes. Discuss questions at the end of the chapter and discuss the differences between performance and aesthetic finishes.

Finally, show examples of labeled fabric swatches of performance finishes. Discuss each finish. Let students examine each swatch and finish closely. Display the finishes on the bulletin board.

Objective 2: Identify aesthetic finishes.

Anticipated Problem: What finishes make fabrics more visually appealing?

II. Aesthetic finishes

A. ***Aesthetic finishes*** are treatments that improve the luster, texture, drapability, and surface appearance of fabrics. They achieve a decorative result or an enhanced aesthetic hand or appearance. Some decorative finish effects are not as apparent as others because they enhance the surface texture by brightening or dulling the surface. Aesthetic finishes can be permanent, durable, or temporary. These processes may damage or weaken the fabric.

1. ***Calendaring*** is subjecting fabric to a heavy cylinder roller (a calendaring machine) that applies heat and pressure to change the appearance of the fabric. Calendaring effects can be durable or non-durable and include embossing, moiré, and chintz finishes.
   a. ***Embossed finishes*** are produced using an engraved or bas-relief (raised) calendar roller to press a 3D design into the fabric. Heat and pressure imprint the design on the fabric.
   b. ***Moiré finishes*** are a type of embossing in which the calendar roller is raised just enough to create a watermark or a wood grain design. A moiré "effect" is also produced by printing (pigments) and with jacquard weaves.
   c. ***Chintz finishes*** (or ciré finishes) are treatments that use a glaze (often in the form of a resin) that presses fabric through calendaring rollers to create a polished (shiny) look.
2. ***Napping finishes*** (gigging and raising) are treatments achieved by pulling up or brushing up fabric fibers by passing the fabric over rollers with wires attached to create a pile. Fabric may be napped on one or both sides. Napping produces fleece-type fabrics and is used to make flannel apparel, baby clothes, blankets, etc.
3. ***Suede finishes*** are treatments that actually "sand" the fabric; fibers are pulled up when fabric is passed over rollers fitted with wires. The sanding of the fabric's surface creates a low pile. Suede finishes imitate leather suede, but they are less expensive. The most popular brand name with a suede finish is Ultrasuede™, which is a microfiber that has been sanded and has an extremely short pile. Suede finishes are also known as ***peach skin finishes*** and are used in:
   a. Active wear
   b. Blankets
   c. Sweaters
   d. Coats
   e. Baby clothes
   f. Sleepwear

B. ***Sizing*** is the addition of starch or resin to fabric to increase the weight, to add body, and to add luster to the fabric. A resin finish is preferred as the starch finish washes out.

C. ***Stone wash finishes*** are treatments that create a worn look for new fabrics (usually denim) by washing the fabric with smooth stones. The fabric is placed in a clothes washer with pumice stones or river rocks, and the stones beat against the fabric to produce a softer, worn, and faded look.

D. ***Acid wash finishes*** are treatments that create a more worn look than those of stone wash finishes. The fabric (usually denim or canvas) is sprayed (for a splotchy look) or soaked (for an overall faded appearance) with a diluted solution of chlorine bleach or a solution of potassium permanganate to create a sharper contrast of color on the fabric—from deep indigo blue to pure white. Controlling the amount of chlorine bleach (NaClO or sodium hypochlorite 5.25 percent and the rest is water) or potassium permanganate ($KMnO_4$) that is added to the fabric is critical, as too much weakens the fabric fibers.

E. ***Weighting*** is the process of adding metallic salts to silk fabrics to increase the fabric's weight and crispness. The amount of metallic salts that may be added to silk is regulated by the government because too much weakens the fabric.

Teaching Strategy: *Show students several examples of performance and aesthetic finish fabric swatches that are labeled and mounted on stiff paper. Discuss each finish. Have students take notes on the discussion, and then let students examine the examples closely. Display the finishes on the bulletin board. These will be examples of what you expect students to complete for LS–A.*

Assign LS–A. Assemble unlabeled fabric swatches of performance and aesthetic finishes. Display a minimum of 10 performance and 10 aesthetic finish fabric swatches in amounts necessary for the number of students in the class. Mix the performance and aesthetic finishes together.

Share the video on stone/acid-washing denim at http://www.ehow.com/video_4766554_stone-wash-jeans-home.html. Provide an overview of the lab and the appropriate cautions about working with bleach. Answer any student questions. Assign LS–B. Conduct a class discussion of the various methods students used to acid wash denim.

Review/Summary. Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. Questions at the ends of chapters in the textbook may also be used in the Review/Summary.

Application. Use the included visual master(s) and lab sheet(s) to apply the information presented in the lesson.

Evaluation.

Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is provided.

Answers to Sample Test:

Part One: Matching

1. f
2. c
3. g
4. e
5. b
6. a
7. d
8. h
9. i
10. j

Part Two: Completion

1. nanotechnology
2. antimicrobial
3. calendaring
4. stone wash
5. finishes
6. insect bite resistant
7. aesthetic

Part Three: Multiple Choice

1. a
2. c
3. b
4. d
5. d
6. b
7. d

Sample Test

Name _____

Finishes

Part One: Matching

Instructions: **Match the term with the correct definition.**

a. fade-resistant finishes
b. mercerization
c. moth-repellant finishes
d. napping finishes
e. preshrunk fabric
f. Sanforized™ fabric
g. suede finishes
h. waterproof finishes
i. water-repellant finishes
j. weighting

_____1. Fabrics that will not shrink (or gain) more than 1 percent in size when cleaned or laundered

_____2. Topical chemical applications for wool or cellulosic fabrics to repel moths, carpet beetles, and other insects

_____3. Treatments that actually "sand" the fabric; fibers are pulled up when fabric is passed over rollers fitted with wires

_____4. Items that will not shrink more than 3 percent when cleaned or laundered

_____5. The application of caustic soda or lye to cotton or rayon to improve luster and absorbency, increase the affinity for dye absorption, reduce shrinkage, and improve fabric strength

_____6. Treatments that prevent fabrics from fading during laundering, dry cleaning, and sunlight exposure

_____7. Treatments achieved by pulling up or brushing up fabric fibers by passing the fabric over rollers with wires attached to create a pile

_____8. Compounds that coat fabric and do not allow water to penetrate fabrics

_____9. Treatments that protect against water damage by making textiles less hydrophilic (water absorbing)

____10. The process of adding metallic salts to silk fabrics to increase the fabric's weight and crispness

Part Two: Completion

Instructions: **Provide the word or words to complete the following statements.**

1. The science of altering the molecular structure (atom to atom) of fabric to create a finish is _____.
2. Chemicals that suppress bacteria, mold, and mildew and slow or prevent the rotting process provide a/an _____ finish.
3. Subjecting fabric to a heavy cylinder roller that applies heat and pressure to change the appearance of the fabric is _____.
4. Pumice stones or river rocks can be used to change the appearance of denim and produce a/an _____ effect (or finish).
5. The processes applied to fabrics to improve the look, performance, or hand of the finished textile or clothing are _____.
6. Finishes that include chrysanthemum oil to resist ticks, mosquitoes, ants, flies, and chiggers are _____.
7. A process performed on fiber, yarn, or fabric after weaving or knitting to improve the look, performance, or hand (feel) of the finished textile or clothing is considered a/an _____ finish.

Part Three: Multiple Choice

Instructions: **Circle the letter of the correct answer.**

1. Of the following, _____ play an important role in crease-resistant, wrinkle-free, and wrinkle-resistant finishes on fabrics.

    a. resins
    b. polymers
    c. esters
    d. atoms

2. Antistatic finishes retard _____.

    a. heat
    b. pigments
    c. electric shock
    d. flammability

3. Antistatic finishes are especially import for _____ fabric.

    a. rayon and cotton
    b. wool and synthetic
    c. cotton and wool
    d. linen and cotton

4. Flame-resistant and flame-retardant finishes are important for _____.

    a. diving apparel
    b. hunters' clothing
    c. paint
    d. children's sleepwear

5. Flame-resistant and flame-retardant finishes work by _____.

    a. cutting off the oxygen supply and causing the flame to extinguish
    b. using chemicals to stop ignition of flame
    c. using chemicals to slow flame spread and then self extinguish
    d. All of the above

6. After numerous washings, flame-resistant and flame-retardant finishes may _____.

    a. increase in effectiveness
    b. wear off
    c. cause shrinkage
    d. become more shock resistant

7. Of the following choices, an important finish applied to wool is _____.

    a. water proofing
    b. calendaring
    c. suede
    d. moth proofing

PERFORMANCE FINISHES

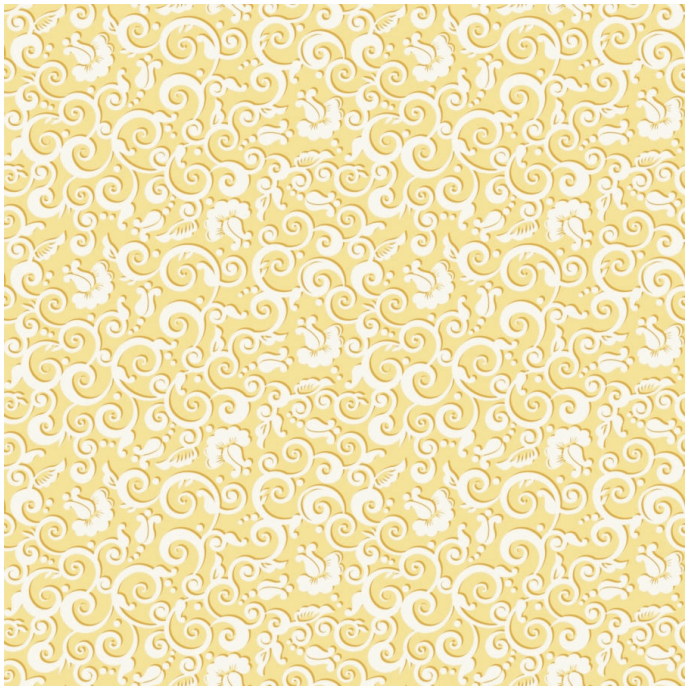
- Antistatic finishes inhibit static electric shocks. Think about the times you have walked across a carpet, touched a light switch, and received a small electric shock.

- Antimicrobial fabric finishes are a result of nanotechnology advances and inhibit mold growth on textiles.

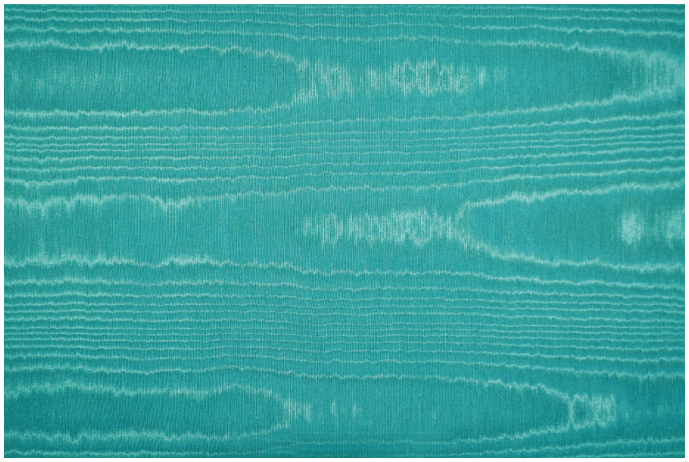
- Insect-bite-resistant finishes inhibit insect bites from ticks, mosquitoes, ants, flies, and chiggers.

- The moisture-repellant fabric finish on these outdoor chair cushions and the umbrella provide a longer life for this furniture.

AESTHETIC FINISHES



♦ This example of 3D embossed damask silk fabric has an elegant floral pattern.



♦ This example of moiré silk satin fabric has a watermark pattern created by calendaring rollers.

♦ The shiny, glazed fabric on this vintage lampshade is chintz fabric created by the calendaring process.

- This fleece jacket has a napped finish that creates a soft pile surface.

- Stone wash and acid wash fabric finish processes can create a worn look on denim and canvas.

- The suede fabric finish is used to create microfiber cleaning cloths and Ultrasuede™ clothing. The fabric's surface fibers are "sanded" to create a low pile.

LS–A

Name _____

Textile Finishes Chart

Purpose

The purpose of this activity is to identify and describe fabric finishes.

Objectives

1. Identify and describe 10 performance finishes.
2. Identify and describe 10 aesthetic finishes.
3. Mount the fabric swatches in the Textile Finishes Chart.

Materials

- lab sheet
- class notes
- textbook and/or reference books
- computer with Internet access (optional)
- unlabeled performance and aesthetic finish swatches mixed together
- glue or other adhesive to mount swatches

Procedures

1. Work independently or in pairs. Identify and describe performance and aesthetic fabric finishes.
2. Select 10 performance finish fabric swatches from the materials set up by your instructor.
3. Select 10 unlabeled aesthetic finish fabric swatches from the materials set up by your instructor.
4. Complete the four columns of the Textile Finishes Chart below.
5. Mount the fabric swatches on the Textiles Chart.
6. Participate in a class discussion of the performance and aesthetic finishes.
7. Turn in your completed lab sheet to your instructor.

Performance Finish	Finish Characteristics	Finish Application	Performance Features
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Aesthetic Finish	Finish Characteristics	Finish Application	Aesthetic Features
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Name _____

Acid Washing Denim

Purpose

The purpose of this activity is to create an acid wash finish on denim fabric.

Objectives

1. Remove dye from jeans (or denim) through the acid wash process.
2. Change the finish of denim.
3. Describe the hand of the denim before and after the acid wash process.

Materials

- lab sheet
- denim jeans or denim fabric swatches
- 1 sheet of heavy plastic (such as a tarp)
- rubber gloves
- pumice stones or river rocks pre-soaked in full strength chlorine bleach (sodium hypochlorite 5.25 percent)

Procedure

1. Wear old clothes or cover your clothes with a lab coat or old shirt and slacks.
2. Work in pairs.
3. Cover a table or counter with plastic. Then collect rubber gloves, bottles of bleach spray, a bleach-soaked pumice stone, and a denim swatch or jeans.
4. Describe the hand of the denim before the acid wash using three adjectives.

   a.

b.

c.

5. Lay the jeans or denim swatch flat on the plastic.
6. Rub the denim with a bleach-soaked pumice stone. The bleach discolors (removes dye) from the denim, and the pumice stone abrades (rubs or wears away with friction) it. Common areas to abrade are the knees, pockets, and the backside.
7. Turn over the denim and continue abrading the fabric with the pumice stone.
8. Let the denim sit for up to 20 minutes. You will be able to watch the denim fade. The longer the denim sits in the bleach solution, the lighter the color will become. However, if the denim sits for longer than 20 minutes, the bleach will begin to weaken the fibers.
9. Fill the clothes washer with water. Wash the jeans two to three times to rinse out all the bleach.
10. Dry the jeans.
11. Note the difference in the hand, color, and texture of the jeans. Describe the hand of the acid wash denim using three adjectives.

    a.

    b.

    c.

12. Participate in a class discussion of the effects of an acid wash finish on denim.

Acid Washing Denim

1. Acid washing was popular in the 1980s. Most processes used chlorine bleach as the active ingredient. Bleach discolors or washes out denim and other clothing, furniture, floors, counters, etc. Instruct students on the safe use of bleach. Have students wear old clothes and rubber gloves when handling bleach. Also, provide a well-ventilated area for students to work while conducting the acid wash lab.
2. Remind students:
    a. Never mix chlorine bleach with any other household or cleaning products. It could result in other harmful acids or poisonous gases being formed that may cause breathing problems.
    b. Bleach damages clothing, is irritating to skin, and can cause serious damage to eyes, even blindness. As with any chemical, you should know the risks of exposure.
3. Accident advice from the U.S. Environmental Protection Agency:
    a. If you, or someone you are with, splashes a household chemical in the eyes, rinse out the eyes for 15 to 20 minutes in the shower or under a faucet. Then call your poison control center at 1-800-222-1222. You can also call 911 or your local emergency ambulance number.
    b. If someone splashes a household chemical on the skin, take off the wet clothing and rinse the skin for 15 to 20 minutes in the shower or under a faucet. Then call your poison control center at 1-800-222-1222. You can also call 911 or your local emergency ambulance number.
    c. If someone drinks a household chemical, give him or her half a glass of water to drink. Then call your poison control center at 1-800-222-1222. You can also call 911 or your local emergency ambulance number.
    d. If someone inhales a poisonous gas, quickly get the person to fresh air. Do not breathe the fumes yourself. Open all the doors and windows as wide as possible. Call your poison control center at 1-800-222-1222. You can also call 911 or your local emergency ambulance number.
    e. If someone is not breathing or won't wake up, call 911 or your local emergency ambulance number. All poison control centers now have the same telephone number. It is 1-800-222-1222.
    f. If you would like more information on poison prevention or want to know about your local poison control center, use Google or another search engine and the terms "State and Regional Poison Control Centers." In Illinois the center's information is AAPCC Certified Illinois Poison Center, 222 South Riverside Plaza, Suite 1900, Chicago, IL 60606 and Emergency Phone: (800) 222-1222; (312) 906-6185 (TTY/

TDD). They may also be listed on the inside cover or first few pages of your telephone book.

4. One day prior to the acid wash denim lab:
   a. Submerge pumice stones or river rocks in full-strength chlorine bleach (5.25 percent) and soak overnight.
   b. Collect the remaining materials, and print lab sheets sufficient for the size of the class.
5. For the post-lab discussion: Have students describe in a few adjectives the hand of the denim before and after the acid wash lab. The intended outcome of the lab is a denim product that is softer, lighter, and better wearing due to the acid wash.