Nasco Education

LESSON PLAN

FCS

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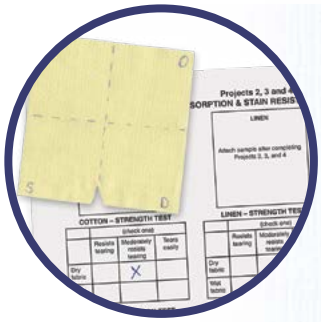
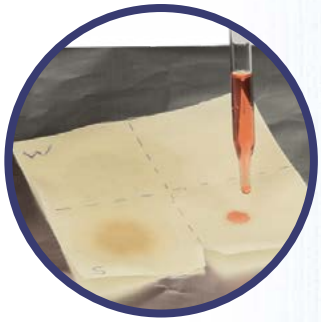
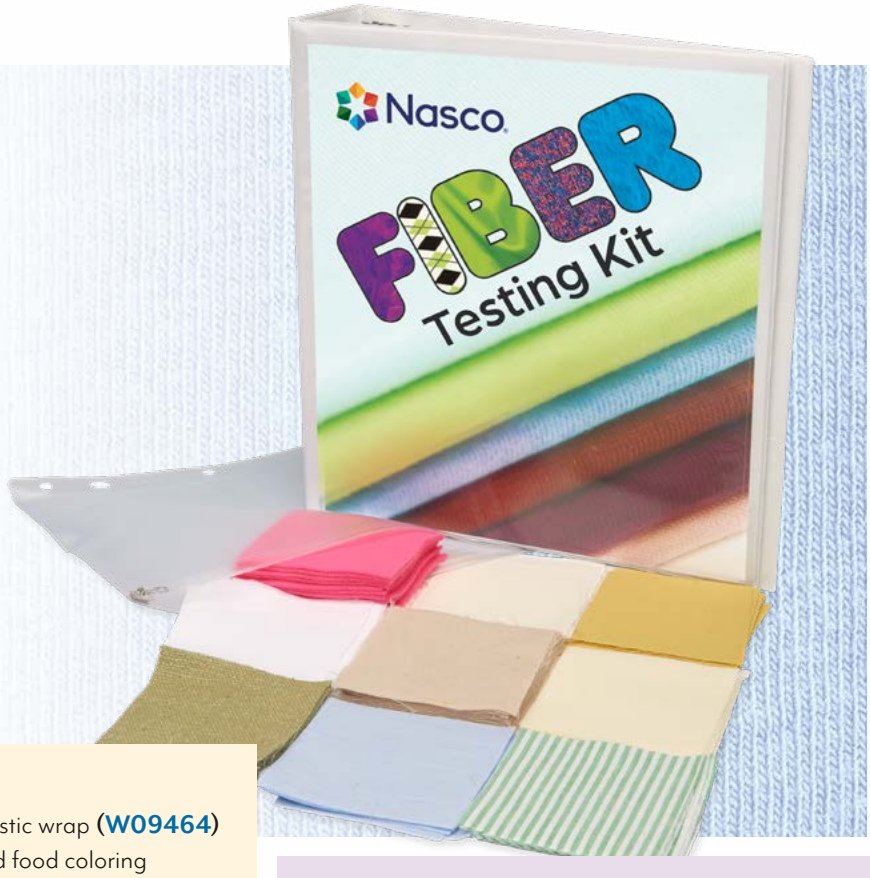
Textiles testing







National FCS Standards:

Area of Study — **16.0**, Textiles, Fashion, and Apparel Content Standards — **16.2** Evaluate fiber and textile products and materials Competencies — **16.2.1, 16.2.2, 16.2.3, 16.2.4, 16.2.5**

*Full descriptions attached on handout.

Materials list

- Nasco Fiber Testing Kit (**WA35039**)
- Fabric scissors (**WA32778 or 9728984**)
- Ink pen or pencil
- Permanent markers [**9717997(A)**]
- Aluminum foil (**W09460**)
- Sewing pins (**WA05861**)
- Stapler (**TB20635**), fabric glue (**9726500**), or tape (**9740908**)
- Tweezers (**C34393**)
- 3 glass containers
- Paper towels
- Clock with second hand or timer
- Eyedropper or pipettes (**SA01161**)
- Olive oil or vegetable oil
- Plastic wrap (**W09464**)
- Red food coloring
- Caramel–colored soda (not diet)
- Vinegar
- Plastic or rubber gloves
- 100% acetone nail polish remover
- Masking tape (**9701126**)
- Safety goggles, Set of 5 (**SB46929**)
- Bleach (with at least 5.5% sodium hypochlorite)
- Unscented tea candle
- Glass dish or disposable aluminum pan
- Lighter or matches
- Iron
- Ironing surface
- Glue gun (**9731443**)

Introduction

- Explain the overview of the project to students.
- Discussion questions (see Appendix page 1).

Formative assessment

(20-30 minutes)

Formative Assessment Teacher Guidelines includes Materials List and Directions (found at end of lesson).

- Weave a roving yarn that is bulky and plush. Have the students manipulate the yarn into a design of their choice using knots and ties. They may add other types of fabric with a glue fun or tie in other pieces of fabric. They may use water to warp the fabric. In addition, they may use permanent markers to color them and then water to dilute the yarn. Be creative! Allowing students to self-design will influence a greater discussion later.
- Have students number their design with a designated number given to each student by the teacher.
- Have students display their woven masterpieces to create a gallery-like setting.
- Allow students a few minutes to walk about and look at each piece. They may feel the pieces, but they may not move or adjust them.
- Discussion questions (see Appendix page 1).

Activity 1 (20–30 mins.)

Show examples of generic and natural fibers. Talk about the differences (see Appendix pages 2-4).

Activity 2 (20–30 mins. per fabric test)

Important Middle School Disclaimer: For each of the following project testing activities, set class up into groups of four. Each day, one of the groups will complete a project. While the one group of four completes a project, the rest of the class will work on a sewing project as directed by the teacher. This way all students can acquire fabric testing skills and draw their attention to sewing as well. Students will be able to apply concentration more effectively when working in this manner.

Please refer to the Nasco Fiber Testing Kit (WA35039) and complete topics below.

Control sample & appearance tests

- Follow Project 1 worksheet provided in kit to record results.
- Materials needed: fabric swatches provided in kit, scissors, ruler, stapler, at least 27 sewing pins, and pen or pencil.
- Discussion questions (see Appendix page 5).

Strength test

- Follow Projects 2, 3, and 4 worksheets provided in kit to record results.
- Materials needed: ink pen, scissors, container or water, paper towels, and ruler.
- Discussion questions (see Appendix page 5).

Absorption test

- Follow Projects 2, 3, and 4 worksheets provided in kit to record results.
- Materials needed: aluminum foil, clock with a second hand, container of water, eyedropper, and paper towels.
- Discussion questions (see Appendix page 6).

Stain resistance test

- Follow Projects 2, 3, and 4 worksheets provided in kit to record results.
- Materials needed: aluminum foil, container of water, olive or vegetable oil, eyedropper, iron, plastic wrap, paper towels, red food coloring, caramel-colored soda (not diet), styrofoam cup, vinegar, orange juice, lipstick, chocolate (rubbed in), suntan lotion, and grass stains.
- Discussion questions (see Appendix page 7 – two charts available).

Heat resistance test

- Follow Projects 5 & 6 worksheet provided in kit to record results.
- Materials needed: iron, aluminum foil, clock or timer, and safe ironing surface.
- Discussion questions (see Appendix page 8).

Thermoplasticity test

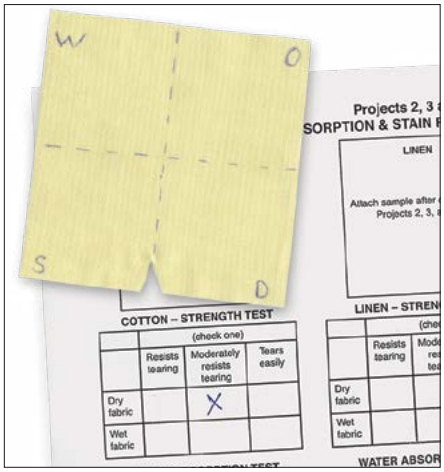
- Follow Projects 5 & 6 worksheet provided in kit to record results.
- Materials needed: iron, container of water, clock or timer, and paper towels.
- Discussion questions (see Appendix page 8).

Solubility test

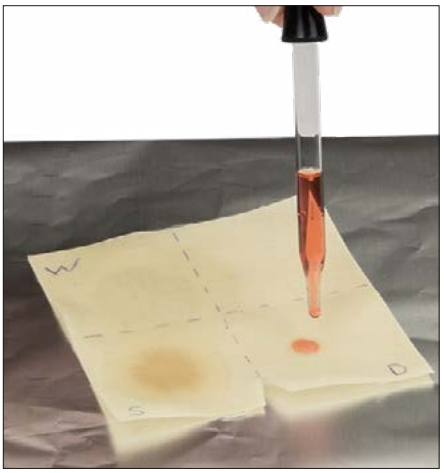
- Follow Project 7 worksheet provided in kit to record results.
- Materials needed: two glass containers, paper towels, rubber gloves, 100% acetone nail polish remover, masking tape, clock or timer, safety goggles, and bleach with at least 5.5% sodium hypochlorite (general brands have this).
- Discussion questions (see Appendix pages 8 & 9).

Burn test

- Follow Project 8 worksheet provided in kit to record results.
- Materials needed: unscented tea candles, container of water, glass dish, disposable aluminum pan or aluminum foil, lighter or matches, and sewing pin.
- Discussion questions (see Appendix page 9).



Strength test



Stain resistance test

Mystery fabric conclusion (5–10 minutes)

- Reference Project 1-8 worksheets provided in kit to answer discussion questions.
- Discussion questions (see Appendix page 9).

After lesson classroom–to–community connection

As a middle school classroom, the whole class should be involved in this discussion.

- Review questions asked on Formative Assessment sheet.
- Discussion questions (see Appendix page 10).

For organization and better student understanding, discussion questions may be printed, attached, and answered on the back of each testing sheet.

Formative Assessment

Teacher Directions: Using constructive critique, ask the following questions. Students should use descriptive answers.

Which piece catches your eye? Why?
Which piece had the best hand? Explain what "hand" means in textiles.
Which creation was hydrophilic or hydrophobic? Explain what "hydrophilic and hydrophobic fibers" mean in textiles.
Did any creation have luster? Explain what "luster" means in textiles.
Did you feel that any creation was stain repellent or stain resistant? Explain what "stain repellent" or "stain resistant" means in textiles.
What do you think your creations have to do with textiles and fabric testing?

Introduction

Teacher Directions: Ask the following questions to introduce Textiles Testing to the students.

Why do you think we are going to test the fabric?
What purpose in your life and the lives of others do you think this lab has?
What do you anticipate we will be doing next?

Activity 1

Directions: Fill out the table below with the appropriate information given by the teacher. When completing, make sure to write a description that will help you remember. You do not need to write the exact definition. Hand refers to the touch. Please include what you feel when you pick up the fabric. Lastly, complete a drawing, print out a small picture, or prepare a swatch of fabric for the last part of the table shown below.

Classifications of Generic Fibers:

Name: Cellulose

Description	Hand	Picture or Swatch

Name: Protein

Description	Hand	Picture or Swatch

Name: Synthetic

Description	Hand	Picture or Swatch

Name: Mineral

Description	Hand	Picture or Swatch

Classifications of Natural Fibers:

Name: Cotton

Description	Hand	Picture or Swatch

Name: Linen

Description	Hand	Picture or Swatch

Name: Silk

Description	Hand	Picture or Swatch

Name: Wool

Description	Hand	Picture or Swatch

Classifications of Manufactured Fibers:

Name: Synthetic

Type: Acrylic

Description	Hand	Picture or Swatch

Type: Polyester

Description	Hand	Picture or Swatch

Name: Regenerated

Sub-Type: Acetate

Description	Hand	Picture or Swatch

Sub-Type: Rayon

Description	Hand	Picture or Swatch

Activity 2: Summative Discussion Questions for Each Test

Control Sample & Appearance Test:

Question	Answer
What general statement can you make about the RESILIENCY (crease recovery) of NATURAL FIBERS? What about SYNTHETIC FIBERS?	
Which fabrics would you use in a wedding dress? Why?	
What types of clothing could be made from each of the fabrics? Home furnishings? Other uses?	
Which fabric would drape the best for a circular skirt?	

Strength Test:

Question	Answer
Which fabrics were easier to tear when dry?	
Did any of the fabrics become easier to tear once they were wet?	
Did any of the fabrics become harder to tear once they were wet?	
How might the results of the STRENGTH TEST affect the care or cleaning of a garment made with the same fiber?	

Absorption Test:

Question	Answer
Which fabrics absorbed the water into the fibers (hydrophilic) of the fabric?	
Which fabrics demonstrated WICKING?	
Which fabric allowed the water to spread over the largest area?	
Which characteristic – hydrophilic or hydrophobic – would make a fabric dry faster?	
Which characteristic – hydrophilic or hydrophobic – would you want in your shirt on a hot day?	
Absorbency is also a key factor in static electricity, since moisture will conduct or bleed electrical charges away. Which of your swatches would be least likely to have static electricity? Which of your swatches would have the most static electricity?	
Why is the amount of water absorbed by a fabric important?	

Stain Resistance Test:

Questions AFTER Steps #1-16	Answer
Which fabric swatches had the worst soda (sugar-based) stains? What characteristic did these fabrics have in common?	
Which fabric swatches had the worst dye stains? What characteristic did these fabrics have in common?	
Which fabric absorbed the oil stain and did not release it (OLEOPHILIC)? Why might this happen?	
What effect did ironing the samples have in the ability to rinse the stains out? Did the stain wash out the same or differently than the air-dried samples?	
The ink pen used to mark the squares is an additional stain; did any of the ink stains rinse out with the warm water?	

Questions AFTER Steps #18-21	Answer
Did the vinegar rinse have any effect on the soda (sugar-based) stains? Oil stains? Dye stains? Ink stains?	
Did the air-dried stains react differently than the iron-dried stains in the vinegar rinse?	
How will the outcomes of this test assist you in the laundry care of your clothing?	
Fabrics that are more absorbent may take stains and dyes more easily. Did you observe this result?	

Heat Resistance Test:

Question	Answer
Which fibers were most affected by heat?	
How might the results of this test influence the way you launder, dry, or iron your own clothing?	

Thermoplasticity Test:

Question	Answer
Which fabric was THERMOPLASTIC?	
Laying the POLYESTER sample flat, does one side of the folded rectangle look shinier than the other? Where the iron touched the POLYESTER on the one side of the fold would have flattened the fibers, making them appear shinier. The other side touching the ironing board would remain unaffected.	

Solubility Test:

Question AFTER steps #1-16 (PART #1)	Answer
Which fibers did the bleach affect, by either dissolving or becoming mushy?	
What fiber classification do these fibers have in common?	
Which fabric's colors were affected or changed by immersion in the bleach?	
What is chlorine bleach used for?	

Would you use bleach on all fibers? Why or why not?	

Question AFTER steps #1-7 (PART #2)	Answer
Which fibers were most affected by the acetone solution?	
Why do you think the acetone would affect the fibers in this manner?	
Name one common use for acetone.	

Burn Test:

Question	Answer
What are the differences between the way the NATURAL FIBERS and the SYNTHETIC FIBERS burned?	
What are the similarities between the NATURAL FIBERS and SYNTHETIC FIBERS?	
Thermoplasticity is a process where the fibers become soft and eventually melt when heated. Which fibers exhibited this characteristic? Did this match the THERMOPLASTICITY TEST?	
Why do you think the BURN TEST cannot be used as the sole test to identify a fabric?	
If you are having a barbecue with an open flame, should you wear lightweight, loose fitting clothing or a more closely fitted, medium-weight garment? Why?	

Mystery Fabric:

Question	Answer
Be prepared to discuss the results of each of the fiber tests to support their conclusions of the fiber content of the MYSTERY fabric.	

After Lesson Classroom-to-Community Connection

Teacher Directions: Review the following questions from the formative assessment. Talk about the differences between each discussion with your classroom.

Now that you have completed the fabric test, why do you think we tested different types of fabrics?
What purpose in your life and the lives of others do you think this lab has?

General Directions: Use this project in conjunction with the Textiles Testing project. This project should be used for the class as each station occurs. For example, while the Thermoplasticity test is awaiting drying, have the students work on this weaving project. In addition, this project can be completed on off days for each group of students. See Grouping Example and Weekly Schedule.

Objective: Use the Weaving Project to teach students about weaving of yarn and thread. In doing so, make sure students read what type of textiles are used.

Materials List:

- 2 Yarn Bundles of Any Yarn Textile per Student (should be on their supply list at the start of class)
- Scissors (should be supplied for students)
- Colored Paperclips (should be supplied for students)
- Shoebox, Bin, or Other Storage Device for Daily Use
- Assess to the Internet and a Technology Device on Which to Watch

Directions: Have students, working in their groups, learn how to weave yarn.

1. Have students work on the Weaving Project by watching the "DIY Arm Knitting – 30 Minute Infinity Scarf" video on YouTube. As they progress through the project, they may play and stop the video on your widescreen, Promethean board, iPad®, iPod®, laptop, desktop, or the like. Video: https://www.youtube.com/watch?v=070qaUxEyp4
2. To pause a scarf place the paperclips around the location in which the students' arms were in. Color-code them. For example, yellow is the left arm and purple is the right arm.
3. Use a separate bin to store your students' work to assure the yarn does not get tangled between students and days.

Grouping Example: In a 24-student classroom, see the grouping as follows.

Groups	Students
1	4
2	4
3	4
4	4
5	4
6	4

Weekly Schedule: Working with groups, follow the recommended schedule below.

Week 1:

Monday	Tuesday	Wednesday	Thursday	Friday
1. Formative Assessment: Weave a Roving Yarn (All Students) 2. Introduction (All Students)	1. Formative Assessment: Discussion (All Students) 2. Explain the Weaving Project (All Students)	Activity 2: Control Sample & Appearance Tests (All Groups)	1. Activity 2: Strength Test (Students in Groups 1, 3, and 6) 2. Weaving Project (Students in Groups 2, 4, and 5)	1. Activity 2: Absorption Test (Students in Groups 2, 4, and 5) 2. Weaving Project (Students in Groups 1, 3, and 6)

Week 2:

Monday	Tuesday	Wednesday	Thursday	Friday
1. Activity 2: Stain Resistance Test (Students in Groups 1, 3, and 6) 2. Weaving Project (Students in Groups 2, 4, and 5)	1. Activity 2: Heat Resistance Test (Students in Groups 2, 4, and 5) 2. Weaving Project (Students in Groups 1, 3, and 6)	1. Activity 2: Thermoplasticity Test (Students in Groups 1, 3, and 6) 2. Weaving Project (Students in Groups 2, 4, and 5)	1. Activity 2: Solubility Test (Students in Groups 2, 4, and 5) 2. Weaving Project: Finalize Project (Students in Groups 1, 3, and 6)	1. Activity 2: Burn Test (Students in Groups 1, 3, and 6) 2. Weaving Project: Finalize Project (Students in Groups 2, 4, and 5)

Week 3:

Monday	Tuesday	Wednesday	Thursday	Friday
Mystery Fabric (All Groups)	After Lesson Classroom-to-Community Connections (All Students)			

References: Kurtz, Audra. "DIY Arm Knitting - 30 Minute Infinity Scarf" *YouTube*. YouTube, 8 Sept. 2013. Web. 27 Apr. 2015.

What is a roving yarn?
The top of spinning fiber that is processed from wool, but not yet spun into a yarn.

Materials Needed:

- Roving Yarn Fiber Samples (this will help reduce costs — 4 full sample rolls of various colors — Bernat Roving is a good example of a cost-effective yarn)
- Permanent Markers in Different Colors
- Fabric Markers
- Glue Gun with Extra Glue Sticks
- Paper or Plastic Cup for Water
- Embellishments (if desired)

Teacher Directions:

1. Each student will receive at least 4 ft. of roving yarn. Make sure each student picks up at least four different colors of yarn to equal 4 ft.
2. Allow students to make loops and knots from the yarn.
3. Students may then color the yarn with permanent or fabric markers.
4. A glue gun may be used to add embellishments, if desired.
5. Students may use hot and cold water and/or stretch or compress the yarn as well.
6. Once done (should take 20-30 minutes) display the pieces of artwork. Each artwork should have a designated number by it that is assigned by the teacher.
7. At this time, begin your constructive critique. For discussion questions, see Appendix page 1

National Standards for Family and Consumer Sciences Education

Developed by National Association of State Administrators of Family and Consumer Sciences (NASAFACS)

Area of Study 16.0
Textiles, Fashion, and Apparel

Comprehensive Standard
Integrate knowledge, skills, and practices required for careers in textiles and apparels.

Content Standards		Competencies	
16.1	Analyze career paths within textile apparel and design industries.	16.1.1	Explain the roles and functions of individuals engaged in textiles and apparel careers.
		16.1.2	Analyze opportunities for employment and entrepreneurial endeavors.
		16.1.3	Summarize education and training requirements and opportunities for career paths in textile and apparel services.
		16.1.4	Analyze the effects of textiles and apparel occupations on local, state, national, and global economies.
		16.1.5	Create an employment portfolio for use with applying for internships, work-based learning opportunities and employment in textiles, fashion, and apparel.
		16.1.6	Analyze the role of professional organizations in textiles, fashion, and apparel industries.
16.2	Evaluate fiber and textile products and materials.	16.2.1	Apply appropriate terminology for identifying, comparing, and analyzing the most common generic textile fibers.
		16.2.2	Evaluate performance characteristics of textile fiber and fabrics.
		16.2.3	Summarize textile legislation, standards, and labeling in the global economy.
		16.2.4	Analyze effects of textile characteristics on design, construction, care, use, and maintenance of products.
		16.2.5	Apply appropriate procedures for care of textile products.
16.3	Demonstrate fashion, apparel, and textile design skills.	16.3.1	Explain the ways in which fiber, fabric, texture, pattern, and finish can affect visual appearance.
		16.3.2	Apply basic and complex color schemes and color theory to develop and enhance visual effects.
		16.3.3	Utilize elements and principles of design in designing, constructing, and/or altering textile, apparel, and fashion products.
		16.3.4	Demonstrate design concepts with fabric or technology/computer, using draping and/or flat pattern making technique.
		16.3.5	Generate design that takes into consideration ecological, environmental, sociological, psychological, technical, and economic trends and issues.
		16.3.6	Apply elements and principles of design to assist consumers and businesses in making decisions.
		16.3.7	Demonstrate ability to use technology for fashion, apparel, and textile design.

National Standards for Family and Consumer Sciences Education

Developed by National Association of State Administrators of Family and Consumer Sciences (NASAFACS)

Area of Study 16.0
Textiles, Fashion, and Apparel

16.4	Demonstrate skills needed to produce, alter, or repair fashion, apparel, and textile products.	16.4.1	Demonstrate professional skills in using a variety of equipment, tools, and supplies for fashion, apparel, and textile construction, alteration, and repair.
		16.4.2	Explain production processes for creating fibers, yarn, woven, and knit fabrics, and non-woven textile products.
		16.4.3	Use appropriate industry products and materials for cleaning, pressing, and finishing textile, apparel, and fashion products.
		16.4.4	Analyze current technology and trends that facilitate design and production of textile, apparel, and fashion products.
		16.4.5	Demonstrate basic skills for producing and altering textile products and apparel.
16.5	Evaluate elements of textile, apparel, and fashion merchandising.	16.5.1	Apply marketing strategies for textile, apparel, and fashion products.
		16.5.2	Analyze the cost of constructing, manufacturing, altering, or repairing textile, apparel, and fashion products.
		16.5.3	Analyze ethical considerations for merchandising apparel and textile products.
		16.5.4	Apply external factors that influence merchandising.
		16.5.5	Critique varied methods for promoting apparel and textile products.
		16.5.6	Apply research methods, including forecasting techniques, for marketing apparel and textile products.
16.6	Evaluate the components of customer service.	16.6.1	Analyze factors that contribute to quality customer relations.
		16.6.2	Analyze the influences of cultural diversity as a factor in customer relations.
		16.6.3	Demonstrate the skills necessary for quality customer service.
		16.6.4	Create solutions to address customer concerns.
16.7	Demonstrate general operational procedures required for business profitability and career success.	16.7.1	Analyze legislation, regulations, and public policy affecting the textiles, apparel, and fashion industries.
		16.7.2	Analyze personal and employer responsibilities and liabilities regarding industry-related safety, security, and environmental factors.
		16.7.3	Analyze the effects of security and inventory control strategies, cash and credit transaction methods, laws, and worksite policies, on loss prevention and store profit.
		16.7.4	Demonstrate procedures for reporting and handling accidents, safety, and security incidents.
		16.7.5	Analyze operational costs such as mark ups, mark downs, cash flow, and other factors affecting profit.
		16.7.6	Demonstrate knowledge of the arts, of various resources, and cultural impact upon the textile, apparel, and fashion industries.