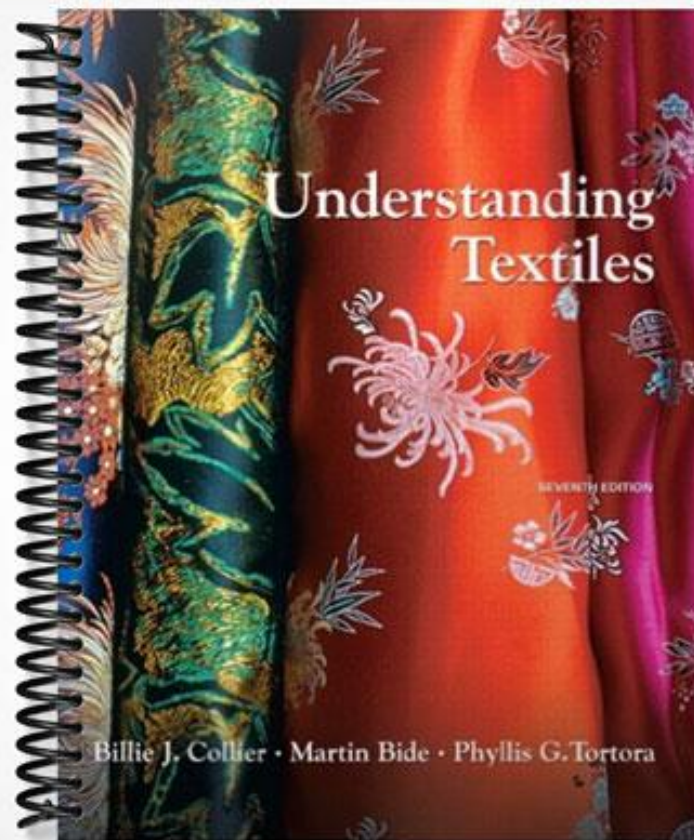



SOLUTIONS MANUAL



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**Instructor's Manual
to Accompany
Understanding Textiles, 7/e**

by

**Billie J. Collier
Martin Bide
Phyllis G. Tortora**



Upper Saddle River, New Jersey
Columbus, Ohio



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Introduction to the Manual

Understanding Textiles (Seventh Edition), the text this Manual accompanies, is intended for an introductory course in textiles. The specific purposes of an introductory textiles course may vary from one institution to another, and different aspects of textiles may be emphasized. The course outline developed within the institution will guide the instructor as to the specific learning objectives and outcomes. As a result the emphasis in presentation of material, in assignments, and in testing may differ quite markedly from one institution to another. In this Manual, we provide a variety of suggestions for teaching and evaluation techniques. Instructors can select those which best suit their needs.

The Manual follows the chapter outline of the text. Each chapter of the Manual includes:

- **Key terms** from the analogous chapter in the text. The list of terms is inclusive and selections can be made by instructors to emphasize particular concepts.
- **Resources** (mainly web sites) that provide further information on the topics in the text chapter. Please keep in mind that some sites are more authoritative and valuable than others, and some are commercial sites.
- **Activities** that instructors may select to supplement their teaching
- **Sample test questions**

In order for students to master concepts basic to understanding textiles, they should have ample opportunity to see and touch actual fiber, yarn, and fabric samples. It is generally recommended that students purchase (or have made available to them) a “swatch kit” containing examples of fabrics. A supplier of swatch kits is:

Textile Fabric Consultants, Inc.
P.O. Box 111431
Nashville, TN 37222
615-459-7510 (800-210-9394)
www.textilefabric.com

The swatch kit is provided with a laboratory notebook, in which samples can be mounted and the characteristics described. The notebook can be retained by students as a continuing reference for the range of textiles in production and use. In addition Textile Fabric Consultants provide other downloadable teaching aids through their web site.

As an alternative to swatch kits, instructors may develop a collection of sample materials that can be passed to students for examination. Such materials may be easier to handle and to organize if they are stapled into file folders and relevant information is noted on the folder.

In addition to the web and other resources listed in each chapter, there are several general resources that can be accessed to update or expand the material presented in the text.

International Textile and Apparel Association (ITAA).

<http://www.itaonline.org>. An organization of professionals in textiles and apparel, ITAA publishes the *Clothing and Textiles Research Journal*.

American Association of Textile Chemists and Colorists (AATCC).

<http://www.aatcc.org>. An organization of textiles professionals, AATCC provides workshops and training in various areas of textiles and product development. The organization publishes the journal, *AATCC Review*.

The Textile Institute. <http://www.texti.org>. An international organization of professionals interested in textiles, clothing, and footwear, the Institute publishes the *Journal of the Textile Institute*.

TRI/Princeton. <http://triprinceton.org>. Originally the Textile Research Institute, TRI/Princeton provides research and information for industry, government, and academic. Now expanded to include materials other than textiles, it publishes the *Textile Research Journal*.

The Fiber Society. <http://www.thefibersociety.org>. The Fiber Society is dedicated to advancement of scientific knowledge pertaining to fibers, fiber based products, and fibrous materials. The Society partners with the Association of the Nonwovens Industry and the Technical Association of the Pulp and Paper Industry to publish the *Journal of Engineered Fibers and Fabrics*.

Costume Society of America (CSA). <http://www.costumesocietyamerica.com>. The Costume Society addresses the global understanding of all aspects of dress and appearance. *Dress* is the journal published by the Society.

<http://textileworld.com> is a web site with news and trade articles about textiles generally and the textile industry.

Encyclopedia of Clothing and Fashion, edited by Valerie Steele, Charles Scribner's Sons, 2005. The Encyclopedia is a ready reference for textile terms, products, processes and history.

Woodhead Publishing Ltd. <http://woodheadpublishing.com>. Based in the United Kingdom, Woodhead publishes books on various areas of textiles. Visits to the web site will keep instructors informed on current titles.

This is by no means a complete list. Many of the organizations listed above have low-cost student memberships, and offer on-line or emailed newsletters to members and non-members alike. They may also sponsor student design competitions with substantial prizes and travel opportunities for the finalists. Such competitions emphasize the relationships between an introductory course in textiles and other courses in design.

Chapter 1 Introduction

Key terms

fiber yarn fabric coloring finishing supply chain retailer electronic data interchange wholesaler distribution center product manufacturer sourcing	textile mill fiber producer natural fiber manufactured fiber trade agreement quota tariff General Agreement on Tariffs and Trade Multifibre Arrangement Agreement on Textiles and Clothing	Textiles Monitoring Body World Trade Organization North American Free Trade Agreement Central American Free Trade Agreement country of origin European Union computer aided design computer aided manufacturing
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Resources

http://faculty.msb.edu/rivolip/	Web page of Dr. Pietra Rivoli, author of <i>The Travels of a T-shirt in the Global Economy</i> contains updates on trade agreements affecting textile products.
http://www.wto.org/english/tratop_e/texti_e/texti_e.htm	Provides a history and activities of the Agreement on Textiles and Clothing, as well as links for other agreements, reports, and legal texts.
http://www.fas.usda.gov/itp/Policy/NAFTA/nafta.asp	Provides description, updates, and analysis of the North American Free Trade Agreement.

Activities

1. Ask students to write down all the textile items with which they have had some contact from the time they awoke in the morning until they entered your classroom.
2. Have students collect articles from *Women's Wear Daily*, *Daily News Record*, *The New York Times*, *The Wall Street Journal*, and other newspapers and

- business magazines about current events, issues, and concerns related to international trade in textiles. Discuss these in class.
3. Examine the job opportunities that the global textile/apparel industry offers to those with training in this area.

Sample Test Questions

1. In order to be suitable for use in a textile, fibers must:
 - a. have a length at least 100 times greater than the width
 - b. be flexible
 - c. have sufficient strength and durability to withstand conditions encountered in processing and use
 - d. **all of the above**
2. To make use of fibers in textile products, these fibers must first be twisted into yarns.
 - a. true
 - b. **false**
3. A textile product is constructed by combining components in the following order:
 - a. fabric, yarn, fiber, finishing
 - b. **fiber, yarn, fabric, finishing**
 - c. yarn, fabric, coloring, finishing
 - d. fiber, yarn, finishing, coloring
4. The textile mill product segment of the textile industry comprises
 - a. nonwovens
 - b. yarn production
 - c. fabric production
 - d. all of the above
 - e. **b and c**
5. In a demand-pull supply chain,
 - a. suppliers determine the product inventory
 - b. products are made in different countries
 - c. **consumer purchases determine production**
 - d. consumers respond to marketing efforts
6. The textile supply chain is:
 - a. product manufacturers, yarn and fabric producers, fiber producers, wholesalers, retailers
 - b. wholesalers, retailers, product manufacturers, yarn and fabric mills, fiber producers
 - c. fiber producers, yarn and fabric mills, product manufacturers, wholesalers, retailers
 - d. **retailers, wholesalers, product manufacturers, yarn and fabric mills, fiber producers**
7. The leading exporter of textile products in 2004 was
 - a. United States
 - b. **China**
 - c. Japan

- d. Hong Kong
8. The agreement that governed international trade in textiles from 1994 to 2005 was
- a. ATC
 - b. GATT
 - c. MFA
 - d. NAFTA
9. What is meant by “the global textile industry”?
- The components of the industry are located in different countries and these countries import and export these components and market the final product worldwide.**

Chapter 2 Textile Fibers

Key terms

manufactured fiber	crosslinks	dry-jet wet spinning
regenerated fiber	degree of	gel spinning
natural fiber	polymerization	emulsion spinning
synthetic fiber	morphology	microfibers
generic fiber names	intermolecular forces	electrospinning
Textile Fiber Products	thermoplastic	hollow fibers
Identification Act	solvent	bicomponent fibers
trademark	delustrant	bicomponent bigeneric
fiber content label	solution dyeing	fibers
country-of-origin	mass coloration	drawing or stretching
transshipment	extrusion	orientation
polymer	spinneret	crystallinity
organic	filament tow	partially oriented yarns
monomer	melt spinning	fully oriented yarns
homopolymer	dry spinning	Type Number
copolymer	wet spinning	merge number

Resources

http://www.fibersource.com	Web site of the American Fiber Manufacturers Association provides generic names, trade names, and descriptions of manufactured fibers, as well as processing information and updates. A video on fiber spinning can also be purchased from this site under the Fiber Economics Bureau tab.
http://www.ftc.gov/os/statutes/textile/rr-textl.htm#303.6	Original text of the Textile Fiber Products Identification Act.

Activities

1. Have students compare the prices of fibers listed in *Women's Wear Daily* (every fourth Tuesday). Ask them to follow and price changes throughout the term of the course; and/or divide students into small groups and assign each group a fiber. Students can then search for current information on that fiber that might include its price, import/export data, new facilities for production (or the closing of older plants), notable new uses for the fiber, and so on.

2. Have students locate advertisements of products in which microfibers have been used. From these advertisements, have them draw conclusions about the types of products in which microfibers seem to be most widely used.

Sample Test Questions

1. Match the fibers in the left column to the classification category in the right column.

a. natural, cellulose	<u>b</u> angora
b. natural, protein	<u>e</u> spandex
c. manufactured, regenerated cellulose	<u>a</u> jute
d. manufactured, regenerated protein	<u>c</u> rayon
e. manufactured, synthetic	<u>e</u> aramid
	<u>e</u> nylon
2. Crosslinks are:
 - a. primary bonds between polymer chains**
 - primary bonds that form polymer chains
 - polar secondary bonds between polymer chains
 - non-polar secondary bonds between polymer chains
3. Which of the following would be added to a polymer liquid before it is extruded into a fiber?
 - Softener
 - flame retardant**
 - crease resistance
 - mothproofers
4. If you see a delustrant in a fiber under the microscope, what do you know?
 - It must be a manufactured fiber**
 - It must be polyester
 - It must be natural
 - It must be linen
5. Which of the methods of spinning fibers takes advantage of the thermoplastic characteristics of fibers?
 - melt spinning**
 - dry spinning
 - gel spinning
 - emulsion spinning
 - wet spinning
6. Viscose rayon and some acrylics are typically formed by
 - melt spinning
 - dry spinning
 - gel spinning
 - emulsion spinning
 - wet spinning**
7. Drawing or stretching of fibers after they have been formed causes
 - the molecules within the fibers to become more parallel and oriented

- b. the fibers to become stronger
 - c. the fibers to become more resilient
 - d. **a and b**
 - e. b and c
8. Generic fiber classifications are based on
- a. **chemical repeat units present in the fibers**
 - b. similarities in appearance
 - c. similarities in fiber properties
 - d. name assigned by the fiber manufacturer
 - e. name assigned by the inventor
9. A fiber manufacturing company has requested that the FTC establish a new generic name for a fiber they are producing. This fiber has a chemical composition that is quite different from any other fiber on the market. It has a specialized use in geotextiles for preventing soil erosion. If the FTC refuses the request, it is most likely because
- a. the fiber is not unique and does not differ radically from other generic fibers
 - b. this fiber could be assigned to an existing generic fiber category
 - c. **the fiber would not be used by the general consuming public**
 - d. all of the above
10. From the list below, identify provisions of the TFPIA in regard to labeling.
- a. Trademark names of all fibers must be listed.
 - b. Fiber quantities of more than 1% must be listed.
 - c. **The name of the manufacturer may be omitted if the manufacturer's registration number is included.**
 - d. Fibers and their trademark names must be listed in order of the percentage of fiber by weight that is present in the product.
 - e. all of the above
11. Under "country of origin" labeling requirements, which would be the minimum amount of information required on the label for the following item: A coat made of wool grown in Australia, the yarn spun and the fabric woven in Italy, and the coat cut and sewn in the United States.
- a. Made in the U.S.A.
 - b. Made in the U.S.A. of Australian wool
 - c. **Made in the U.S.A. of imported fabric**
 - d. Made in the U.S.A. of Italian fabric imported from Australia
 - e. Made of imported fabric