Chapter 6: Textiles & Production

Chapter 6.1: Textiles & Fashion

Chapter 6.2: Making Textiles
Key Terms

- Fabrics
- Fibers
- Yarns
- Natural Fibers
- Filament
- Manufactured Fibers
- Denier
Fabrics & Fibers

- **Fabrics** are long pieces of cloth
- Designers work directly with fabrics, draping and folding it into fashion creations
Characteristics of Fibers

• The basic building blocks of fabric are fibers
• Fibers are thin, hair-like strands that are the basic units used to make fabrics textile products
Types of Fibers and Yarns

- Fibers are spun into yarn
- Yarns are uninterrupted threads of textile fibers that are ready to be turned into fabrics
- Natural
  - Originate from natural sources
  - Plant (cellulosic) or animal (protein)
- Manufactured, synthetic, or man-made (terms interchangeable)
  - Originate from chemical sources
  - May also be from regenerated or recycled sources
Natural Fibers

- Natural fibers are textile fibers made from plants or animals
  - Cellulosic (from plants)
    - Cotton
      - From cotton plants
    - Flax (linen)
      - From flax stems
  - Protein (from animals)
    - Silk
      - From cocoons of silkworms
    - Wool
      - From fleece (hair) of sheep or lambs
Characteristics of Natural Fibers

• Natural fibers are usually:
  - Absorbent
  - Comfortable
  - Cooler to wear
  - Wrinkle more
  - Shrink when washed

• Main natural fibers are:
  - Cotton
  - Linen
  - Wool
  - Silk
Cotton

- Cellulosic fiber
- From “bolls” (seed pods) growing on bushes
- “Environmentally friendly” cotton can be grown in a range of colors
- Main textile products of China and Mexico
- Made into a wide range of wearing apparel
Cotton

Advantages:
- Comfortable
- Absorbent
- Good color retention
- Dyes & prints well
- Washable
- Strong
- Drapes well
- Easy to handle and sew
- Inexpensive

Disadvantages:
- Shrinks in hot water
- Wrinkles easily
- Weakened by perspiration and sun
- Burns easily
- Affected by mildew
Linen (Flax)

- Flax is the fiber name; linen is the fabric name.
- World’s oldest textile fiber, dates back to Stone Age 5,000 years
- Cellulosic fiber from stem of flax plant
- Towels, sheets, and tablecloths are called “linens”
Linen (Flax)

Advantages:
• Strong
• Comfortable
• Hand-washable or dry-cleanable
• Absorbent
• Dyes and prints well
• Resists dirt and stains
• Durable
• Withstands high heat
• Lint-free

Disadvantages:
• Wrinkles easily
• Can be expensive
• Shrinks
• Burns easily
• Affected by mildew and perspiration
• Ravels
• Difficult to remove creases
• Shines if ironed
Wool

- Protein fiber from sheep or lambs
- Worsted wool is higher quality with long staple fibers (over 2 inches)
- Natural insulator
- The term wool can only apply to all animal hair fibers, including the hair of cashmere or angora goat
- As well as the specialty hair fibers of camel, alpaca, llama, or vicuna
Wool

Advantages:
• Warm
• Lightweight
• Wrinkle-resistant
• Absorbent
• Dyes well
• Comfortable
• Durable
• Creases well
• Easy to tailor
• Recyclable

Disadvantages:
• Affected by moths
• Shrinks with heat and moisture
• Needs special care, dry cleaning
• Absorbs orders
• Scratchy on skin
• Weaken when wet
• Harmed by bleach, perspiration
Silk

• Silkworms spin cocoons in filaments
• Filament is a very long, fine, continuous thread
• It can take as many as 500 cocoons to create 1 blouse

Advantages:
- Soft
- Drapes well
- Dyes and prints well
- Very strong
- Lightweight
- Resists soil, mildew, and moths
- Comfortable
- Absorbent

Disadvantages:
- Expensive
- Needs special care, dry cleaning
- Stains with water
- Yellows with age
- Weakened by perspiration, sun, soap
- Attacked by insects, silverfish
Leather/Suede and Fur

- **Leather** - a tough, flexible material, made from animal hides or skins. Animals used include:
  - Cattle (cows, steers)
  - Sheep
  - Goat
  - Pig
  - Reptile
- **Suede** - leather that has a rough “nappy” finish
- **Fur** - soft, hairy coat of an animal. Some countries prohibit seals and leopards being used
# Leather/ Suede and Fur

## Leather/ Suede

**Advantages:**
- Durable
- Strong
- Flexible
- Comfortable
- Warm

**Disadvantages:**
- Scarce
- Expensive

## Fur

**Advantages:**
- Durable
- Soft
- Flexible
- Warm

**Disadvantages:**
- Scarce
- Expensive
Manufactured Fibers

- Manufactured fibers are fibers created by a manufacturing process of any substance that is not a fiber.
- Cellulosic - from generated fibrous substance in plants.
- Noncellulosic or synthetic - made from petrochemical products.
- Process:
  - Raw materials melted or dissolved to form thick syrup.
  - Liquid extruded through spinneret.
  - Extruded filaments stretched and hardened into fibers.
Rayon

- 1st manufactured in 1894 by the American Viscose Company
- Used during WW 1 for industrial products
- Derived from wood pulp, cotton linters, or vegetable matter
- Rayon led to crepe, velvet, and satin fabrics

Advantages:
- Soft and comfortable
- Drapes well
- Durable
- Highly absorbent
- Dyes and prints well
- No static or pilling problems
- Inexpensive
- Colorfast
- May be washable

Disadvantages:
- Wrinkles easily unless treated
- Low resiliency
- Heat sensitive
- Susceptible to mildew
- Stretches
- Weakens when wet
- Fabric shrinks if washed
- May need dry cleaning
Acetate

- Developed in early 20th century
- Produced in 1924 by the Celanese Corporation
- Used to line coats and fabrics

**Advantages:**
- Luxurious appearance
- Crisp (texture) soft hand
- Wide range of colors; dyes and prints well
- Drapes well
- Resists shrinkage, moths, and mildew
- Low moisture absorbency, relatively fast drying
- No pilling, little static

**Disadvantages:**
- Requires dry cleaning
- Weak
- Heat sensitive
- Poor abrasion resistance
- Dissolved by nail polish remover (acetone)
Nylon

- Invented in 1938 by DuPont
- 1st synthetic fiber
- Made completely from petrochemicals in an experimental laboratory

Advantages:
- Lightweight
- Exceptional strength
- Abrasion resistant
- Easy to wash
- Resists shrinkage and wrinkles
- Resilient, pleat retentive
- Fast drying, low moisture absorbency
- Can be pre-colored or dyed in a wide range of colors
- Resists damage from oil and many chemicals
- Insulating properties

Disadvantages:
- Static and pilling
- Poor resistance to sunlight
- Low absorbency
- Picks up oils and dyes in wash
- Heat sensitive
Acrylic

• Manufactured in the 1950’s by DuPont
• Originally used for blankets and sweaters because it resembled wool

Advantages:
- Lightweight, soft, warm, wool-like hand
- Dyes to bright colors
- Machine washable, quick drying
- Resilient, retains shape, resists shrinkage and wrinkles
- Wool-like, cotton-like, or blended appearance
- Excellent pleat retention
- Resists moths, oil, chemicals

Disadvantages:
- Low absorbency
- Develops static
- Pilling
- Heat sensitive
- Weak
- Dissolved by nail polish remover (acetone)
Polyester

Synthetic fiber developed in the 1950’s by DuPont
It helps with the durability of dry-clean-only fibers, such as wool, acetate, or rayon

Advantages:
- Strong
- Crisp, but soft hand
- Resists stretching and shrinkage
- Washable or dry-cleanable
- Quick drying
- Resilient, resists wrinkles
- Abrasion resistant
- Resistant to most chemicals
- Colorfast
- Strong, durable
- Dyes well

Disadvantages:
- Holds oily stains
- Low absorbency, difficult stain removal
- Static and pilling problems
Spandex

- Developed in 1959 by DuPont
- Stretches over 500% without breaking

**Advantages:**
- Lightweight
- Retains original shape
- Abrasion Resistant
- Stronger than rubber
- Soft, smooth, supple
- Resists body oils, perspiration, lotions, detergents
- No static or pilling

**Disadvantages:**
- Whites yellow with age
- Heat sensitive
- Harmed by chlorine bleach
- Nonabsorbent
Microfibers

• Newest trend in fashion
• 1st developed in 1989 by DuPont
• Ultra-fine fiber
• Denier is a unit of measurement used to identify the thickness of diameter of a fiber

• Advantages
  ❖ Extremely drapeable
  ❖ Very soft, luxurious hand
  ❖ Washable or dry cleanable
  ❖ Shrink-resistant
  ❖ Strong
  ❖ Insulates against wind, rain, and cold

• Disadvantages
• Heat sensitive
Lyocell

• Lyocell is the newest of the cellulosic manufactured fibers
• Trade name is Tencel®

Advantages:
  ❖ Absorbent
  ❖ Biodegradable
  ❖ Strong
  ❖ Resists sunlight, aging, and abrasion

Disadvantages
  ❖ Susceptible to mildew

Used to Make:
  ❖ Reusable woven materials
  ❖ Fashion fabrics
  ❖ Soft denims
  ❖ Shirts
Fiber Trade Associations

- Cotton Incorporated - marketing & research organization
- National Cotton Council - central organization of the cotton industry
- Woolmark Americas, Inc. - promotes wool and wool-blend products
- Mohair Council of America - promotional organization for U.S. mohair producers
Fabric’s Influence on Fashion

• The cut and style of garments have always been determined by fiber and fabric

• Fabric will continue to influence fashion as availability and technology change
Chapter 6: Textiles & Production

Chapter 6.2: Making Textiles
Key Terms

- Extrusion
- Finished Fabric
- Weaves
- Knits
Textile Processes: Past & Present

• Manufacturing Innovations include:
  ❖ Eli Whitney: Cotton Gin
  ❖ Joseph Jacquard: Loom
  ❖ Synthetic Fibers
Making Synthetic Fibers

- **Extrusion** is a synthetic textile process in which solid raw materials are dissolved by chemicals or melted with heat to form a thick liquid that is extruded, or forced out, through the tiny holes of a device called a spinneret to create long fibers.
How Fibers Become Fabrics

- Weaving and knitting are the two primary methods for making fibers into fabric.
- A **finished fabric** is fabric that has gone through all the necessary finishing processes and is ready to be used for manufacturing garments.
Types of Weaves & Knits

• Weaves, or woven fabrics, are composed of two sets of yarns with one set running the length and the other set running crosswise.

• Types of weaves:
  • Plain Weave- basic weave, simple interlacing of wrap and filling yarn
  • Twill Weave- interlacing wrap and filling yarns in a progressive alteration
  • Satin Weave- long floats of yarn on the face of the fabric
Types of Weaves & Knits

• Types of weaves:
  ◆ Plain Weave-
  ◆ Twill Weave-
  ◆ Satin Weave-
Knits

• Knits, or knitted fabrics, are made from only one set of yarns that runs in the same direction

• Wales are the ridges that run lengthwise in the fabric

• Courses run crosswise
Textiles and Fashion Marketing

• Yarns and fibers are transformed into fabrics through the magic of creativity and technology

• Textiles, fibers, yarns, fabrics, fur, and leather are the basic building blocks of all fashion products
THE END