

LESSON 3

CUTTING EDGE

9-11 YEAR OLDS

PURPOSE

To learn about the science and technology of different fabrics, their uses, and how they are made.

OBJECTIVES

Youth will be able to:

- ◆ identify fiber families.
- ◆ distinguish between fabric structures: knitted and woven.
- ◆ evaluate selected fabric characteristics.
- ◆ name textile items that are not clothing.
- ◆ become aware of special uses of fibers and fabrics.

LESSON TIME

30 Minutes

LEARNING ACTIVITIES

FIBER FAMILIES
WHAT'S MY NAME?
THE "IN'S" AND "OUT'S" OF FABRICS
FABRIC ABSORPTION
AM I COLORFAST?
TEXTILES IN DISGUISE
SPACE AGE TEXTILES

ADVANCE PREPARATION

1. Read the BACKGROUND BASICS on Cutting Edge.
2. Review activities and choose appropriate one(s) to use.
3. Secure necessary materials as described.

LESSON 3

CUTTING EDGE

Do

The following is suggested for using the activities on Lesson 3. Materials needed for each are listed within the activity.

- ◆ Learn about fibers and their sources in FIBER FAMILIES.
- ◆ Distinguish between weaves and knits in WHAT'S MY NAME? and learn how to weave in THE "IN'S" AND "OUT'S" OF FABRICS.
- ◆ Conduct and evaluate fabric characteristics in FABRIC FUN EXPERIMENTS and AM I COLORFAST?
- ◆ Discover our dependency upon the world of textiles that are not clothing in TEXTILES IN DISGUISE.
- ◆ Become aware of clothing that protects in SPACE-AGE TEXTILES.

REFLECT

After completing the activities in this lesson, help youth reflect on what they have learned with these questions:

- ◆ What are the two sources of fibers?
natural, man-made
- ◆ What is the difference in how a woven and a knit fabric are made?
weaving is an interlacing of yarns and knitting is an interlooping of yarns.
- ◆ What are two types of weaves?
plain, basket
- ◆ What were three specific fabric characteristics you learned through experiments?
drape, absorbency and colorfastness
- ◆ What was the most surprising item you found that was a textile?
- ◆ What would our world be like today without textiles?
- ◆ What are some uses of protective clothing?
clothing worn to protect from hazards such as fire, bullets, insects, and chemicals

APPLY

LESSON 3

CUTTING EDGE

Help youth learn to apply what they have learned to their daily clothing choices.

- ◆ Can you identify the generic fiber, their tradename, and whether the fabric is woven or knitted in garments you buy?
- ◆ How can you use the fabric characteristics you experimented with to evaluate fabrics in garments you make or clothes you buy?
- ◆ What are three examples of textile items in your room that are not clothing.
- ◆ How can you use other information you've discovered in these activities?
- ◆ Encourage youth to:
 - ◆ Go to the library to learn more about textiles in space or other protective clothing.
 - ◆ Prepare a demonstration/illustrated talk on one of the activities/topics in this lesson.
 - ◆ Prepare an exhibit on THE WORLD OF TEXTILES in our lives for the public.

LESSON 3

CUTTING EDGE

BACKGROUND BASICS...Cutting Edge

Fibers are where our fabrics and apparel begin. They are made into yarn. There are two basic types of fibers -- *natural* (from plants and animals) and *man-made* (from chemicals). Sometimes more than one fiber is put together to make a fabric -- the fabric is then called a fabric blend. An example is cotton and polyester blended together.

The Federal Trade Commission (FTC) is responsible for approving new fibers. When they are approved they are given a generic (a family) name. All fibers with the same generic name have similar chemical structures, compounds, and characteristics. The manufacturer of a generic fiber may also use a trademark name to identify who made the fiber (such as Trevira® polyester, Celebrate® acetate).

TYPES OF FABRICS

Natural Fibers

Natural fibers come from plants and animals. The most common types of plant fibers are cotton, linen (flax), and ramie. The most common animal fibers are wool (from sheep) and silk (from silkworms).

- Cotton is a medium strength fiber and is very absorbent.
- Wool is the most resilient, is naturally absorbent, has a tendency to shrink, and is the most wrinkle resistant natural fiber.
- Linen has good absorbency, a natural slub, a natural luster, and is strong for a natural fiber.
- Ramie is very strong, has unusual resistance to mildew, but is a stiff fiber so if repeatedly flexed will break.
- Silk is a very fine fiber, moderately wrinkle resistant, and is weakened by sunlight.

☞ The use of tradenames in this publication is solely for the purpose of providing specific information. It is not a guarantee, warranty, or endorsement of the products' names and does not signify that they are approved to the exclusion of others.

LESSON 3

CUTTING EDGE

Man-Made Fibers

Man-made fibers are made from chemicals or a combination of natural materials and chemicals. Rayon and acetate are the most common of these combinations of natural materials and chemicals. The most common manufactured fibers made from chemicals are polyester, nylon, spandex, and acrylic.

- Rayon is the most absorbent man-made fiber, is inexpensive, wrinkles easily, weakens when wet, and may water spot.
- Acetate is very sensitive to heat, wrinkles easily, is inexpensive, takes color easily, and is not very durable.
- Polyester is easy care, wrinkle-resistant, is heat sensitive, and is oil-loving.
- Nylon is lightweight, very strong, easy care, heat sensitive, and accumulates static electricity.
- Spandex has a high degree of stretch and resists abrasion.
- Acrylic is made to look and feel like wool, resists fading, is heat sensitive, and may pill.

FABRIC CONSTRUCTION

Fibers are made into yarns and yarns are made into fabrics. A yarn is a continuous strand of fiber. They may be twisted together, be small or large, rough or smooth, tightly or loosely twisted. Loosely twisted yarns make a fabric that will wrinkle easily and have a tendency to pill. Fabric is cloth made of textile yarns.

The two most common methods of making fabric are by *weaving* and *knitting*. The way a fabric is constructed affects its durability, use, warmth or coolness, and appearance.

Woven

A woven fabric is made by interlacing two sets of yarns. They go over and under, back and forth. Lengthwise yarns form the foundation of the fabric and are usually stronger (more tightly twisted), and there are more of them per inch. They run parallel to the selvage, which is the finished edge. Crosswise yarns are perpendicular to the selvage. The selvage is made by doubling the number of lengthwise yarns.

A *plain weave* is the most common method of making fabric. It is a basic one-under and one-over combination of a lengthwise and crosswise yarn. When yarns are woven closely together you will have a strong, dense fabric. Examples are: percale, broadcloth, seersucker, organdy. A variation of the plain weave is the *basket weave* which is two or more yarns that are carried together under and over weaving. An example is oxford cloth.

LESSON 3

CUTTING EDGE

A *twill weave* is very strong, has good shape retention, and is durable. It is formed by the crosswise yarns going over one or more lengthwise yarns and then under groups of lengthwise yarns. It gives the effect of a tiny diagonal line on the right side of the fabric. Examples are: denim, gabardine, flannel. A variation of the twill weave is the *herringbone weave* which gives a chevron effect.

A *satín weave* creates a fabric with beautiful luster, but it is easily snagged. In this weave, the crosswise yarns cross the lengthwise yarns in a pattern of under one and over four or more. In reality, it is a variation of the twill weave, but the diagonal effect is not present because the point at which the yarns cross are more widely spaced. The smooth, shiny surface is caused by the right side being almost entirely composed of yarns that run in only one direction. Examples are satin (comes in a variety of different fibers both natural and man-made).

A variation of this weave is the *sateen weave*. In this weave, the process is reversed with the crosswise yarns showing on the right side. An example is polished cotton.

A *pile weave* interlaces three sets of yarns in such a way that one set forms loops or cut ends on the surface. There are two sets of yarns woven either in a plain or twill weave with another set of yarns woven in at the same time to form loops. These loops may be cut as in corduroy and velvet or left uncut as terrycloth. This weave makes a "soft to the touch" fabric that tends to crush and flatten with wear. Examples are: corduroy, velvet, velveteen, terrycloth.

Knits

The two basic methods for making knitted fabrics are *weft* and *warp* knitting. You can usually tell a weft knit from a warp knit by the way it stretches. Weft knits stretch both crosswise and lengthwise equally well. Warp knits stretch more crosswise than lengthwise. Another way to identify a warp knit is by the continuous line of W's on the wrong side of the fabric.

Warp knits have parallel yarns and are formed by loops running lengthwise of the fabric. These loops interlock and connect one lengthwise row with the next. Each needle makes a separate chain stitch and the chains are tied together by the zigzag of the yarns from one needle to the other. They are firmer than double knits and are less likely to snag. The two most common types are *tricot* and *raschel*.

Tricot (a type of warp) knits can be recognized by the fine vertical ribs (wales) on the right side and crosswise ribs (courses) on the back. The greatest stretch is across. It is runproof, snag resistant, and does not ravel. Variations of tricot include velour and a wet, leather-like look.

LESSON 3

CUTTING EDGE

Raschel (a type of warp) knits are usually noted for their lacy, open-work appearance, but they may also be compact and close-knit. They are a more complex warp knit. They are not as durable as other knits. Examples are: hairnets, bridal veils, power net, some laces, dishcloths, and some curtains.

Weft knits have one continuous strand of yarn that runs crosswise to form a horizontal row of interlocking loops. The yarn is carried back and forth to make a flat fabric, or knit around to make a circular fabric. Hand knitting is a simplified form of weft knitting. Weft knits drape well and may have a high degree of stretch. These fabrics may be unraveled. There are four main types of weft knits -- single, rib, purl, and double.

Single knits (sometimes referred to as plain or jersey) are like hand knitting. There is a definite right and wrong side. They have lengthwise ribs on the outside and cross ridges on the back. They are usually lightweight, economical to produce, and therefore less expensive.

Rib knits have lengthwise ribs that alternate on the front and back of the fabric. It gives controlled stretch. They are used in tank tops, waistbands, cuffs, crew and turtlenecks.

Purl knits are made of purl stitches, which cause the right and wrong sides to look the same. Purling is done by reversing consecutive stitches in a course so that loops, which would appear on one side, appear on the other. These knits are known for their lengthwise elasticity.

Double knits have two interlocking layers which cannot be separated. Two single layers are knitted together. This interlocking gives built-in stability with comfort stretch. They are more durable than single knits and hold their shape better. These fabrics look the same on both sides, unless one has texture or pattern.

Fiber Content Labeling

The Textile Fiber Product Identification Act was passed in 1960. The purpose of this law is to protect consumers and producers from false advertising and mislabeling of the fiber content of textile fiber products.

At the point of purchase fiber content information must be available either as a hangtag, printed on the packaging, or it can be on a permanent label. It must list the generic (family) names and percentages of all fibers in the product in amounts of 5 percent or more listed in the order or predominate by weight. Less than 5 percent may be listed as "other fiber" or "other fibers."

On a permanent label the textile item must name the manufacturer OR give a registered identification number that has been filed with the Federal Trade Commission.

LESSON 3

CUTTING EDGE

PROTECTIVE CLOTHING

Some types of jobs need special clothing in order to protect the worker. One of those is the special clothing that is needed by the astronaut. Space suits were created because of the hostile environment in outer space. In order for them to survive air and pressure, moderate temperatures had to be contained in a shell surrounding them. One method of doing this is to encase the astronaut in a protective flexible capsule called the space suit.

Every year technology improves and space suits become lighter, less bulky, and more comfortable. The suit, which will be worn only outside the shuttle, is modular and features many interchangeable parts. Torso, pants, arms, and gloves come in several different sizes and can be assembled for each mission in the proper combinations to suit individual astronauts.

Occupations that use Protective Clothing

There are several occupations that need protective clothing. Some of them are: doctors, nurses, deep sea divers, farmers, carpenters, firefighters, police, sports players, cooks, race car drivers, factory workers, pesticide applicators.

Some Uses of Textiles Other Than Clothing

There are several uses of textiles other than clothing. They include: rugs, window shades, venetian blind cords, upholstered furniture, blankets, sheets, pillows, towels, tires, water hoses, convertible tops, padded dashes, artificial grass, tennis and other sport balls, bandages, sterilized gowns and masks, artificial heart and arteries, and books.

OBJECTIVES:	For youth to: <ul style="list-style-type: none">○ learn about fiber families.○ understand the sources for making fibers.○ practice matching trademark name with family (generic) name and source of fiber.
LIFE SKILL:	○ Critical thinking skills
MATERIALS:	CUTTING EDGE OF FIBERS AND FABRICS Workbook page 11 Copies of FIBERINGO game board for each youth Copies of FIBERINGO Answer Sheet for each youth Dried beans Pencils
TIME:	30 minutes
SETTING:	A comfortable room with tables and chairs.

INTRODUCTION

Fibers have two sources: natural and man-made. Natural fibers may be from plants or animals. Man-made fibers may be from chemical or from plant material and chemicals. The family name of fibers is called a generic name. A company or particular species of a plant or animal can give their fiber a trademark name. Today, we will begin to learn about fiber families.

Do

Learn about FIBER FAMILIES!

- ◆ Hand each youth a FIBERINGO game board, answer sheet, and dried beans.
- ◆ As you call out a tradename or source have them find the appropriate column by the generic name on the answer sheet and write in the tradename or source. Allow a count of 5 before calling the next one.
- ◆ Continue until a column has been filled horizontally, vertically, or diagonally.
- ◆ Take up answer sheets and repeat process using the beans as markers in place of writing in the name.
- ◆ As soon as someone fills a column, they are to call out "Fiberingo." Be sure to review the trade names or sources to make sure correct markings occurred.

REFLECT

- ◆ What are the two sources of fibers?
natural and man-made
- ◆ What does generic mean?
the family name
- ◆ What is a tradename?
a name given by the name of a plant, an animal or by the company manufacturing the fiber.
- ◆ What are the sources of natural fibers?
plant or animal

APPLY

- ◆ Complete the FIBERS AND FABRICS Workbook Activity on page 11.
- ◆ Look at the labels in five of your garments to see how many fiber families and how many tradenames you find.



FIBERINGO

Answer Sheet



GENERIC NAME	TRADEMARK NAME	SOURCE
Cotton	Pima Suprima	Plant
Wool	Merino Lamb's	Animal
Polyester	Trevira Dacron Fortrel	Chemical
Nylon	Antron Cordura Zafran	Chemical
Rayon	Avril Zantrel Fibro	Plant and Chemical





FIBERINGO

COTTON	WOOL	POLYESTER	NYLON	RAYON
				FREE
	FREE			



OBJECTIVES: For youth to:

- distinguish between two common methods of fabric construction.
- identify and associate fabric names to how they are made.

LIFE SKILL: ○ Classification Skills

MATERIALS: Pencils
Posters of Different Weaves and Knits
FABRIC MATCH Activity Sheet

Glue

Magnifying glasses

Fabric swatches

Broadcloth

Denim

Rib Knit

Oxford cloth

Sateen

Corduroy

Satin

Single Knit

Tricot

WHAT'S ITS NAME Workbook page 12.

TIME: 30 minutes

SETTING: A comfortable room with tables and chairs.

ADVANCE PREPARATION:

Collect fabrics and cut into swatches. Make poster and copies of FABRIC MATCH Activity Sheet.

INTRODUCTION

The two most common methods of making fabric are weaving and knitting. A woven fabric is made by interlacing two sets of yarns in different patterns. A knit fabric is made by interlooping one or more yarns. Let's look at fabrics to learn how they are made.

Do

Discover HOW I'M MADE and WHAT'S MY NAME.

- ◆ Use posters to explain the different weaves and knits.
- ◆ Hand each youth a magnifying glass and fabric swatches.
- ◆ Using the magnifying glass and posters identify how each fabric was made.
- ◆ Now hand out the FABRIC MATCH sheet.
- ◆ Place fabric in square that matches its description.

REFLECT

- ♦ What are the two most common methods of making fabric?
weaving, knitting
- ♦ Name three weaves.
plain, basket, twill, satin, sateen, pile
- ♦ What is the difference in how a woven and a knit fabric are made?
weaving is interlacing of yarns, knit is interlooping of yarns
- ♦ What did you see when you looked at a fabric with the magnifying glass?
- ♦ What did you learn about how fabrics are made?

APPLY

- ♦ Fill out WHAT'S ITS NAME in the Workbook, page 12, matching the name with the letter of the weave or knit illustration.
- ♦ Look at six textile fabric items at home and identify them as a knit or woven.
- ♦ Show a family member or friend the difference in how a weave or knit stretches.

FABRIC MATCH

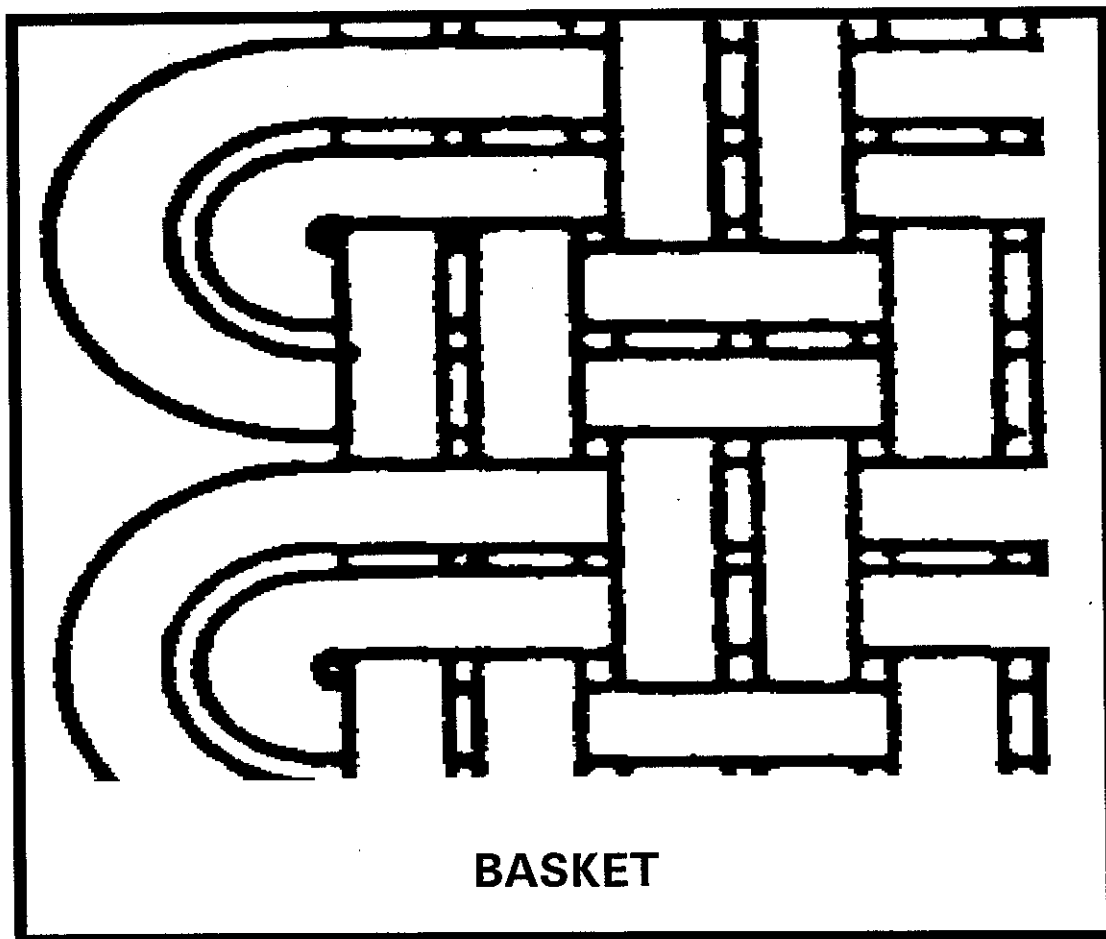
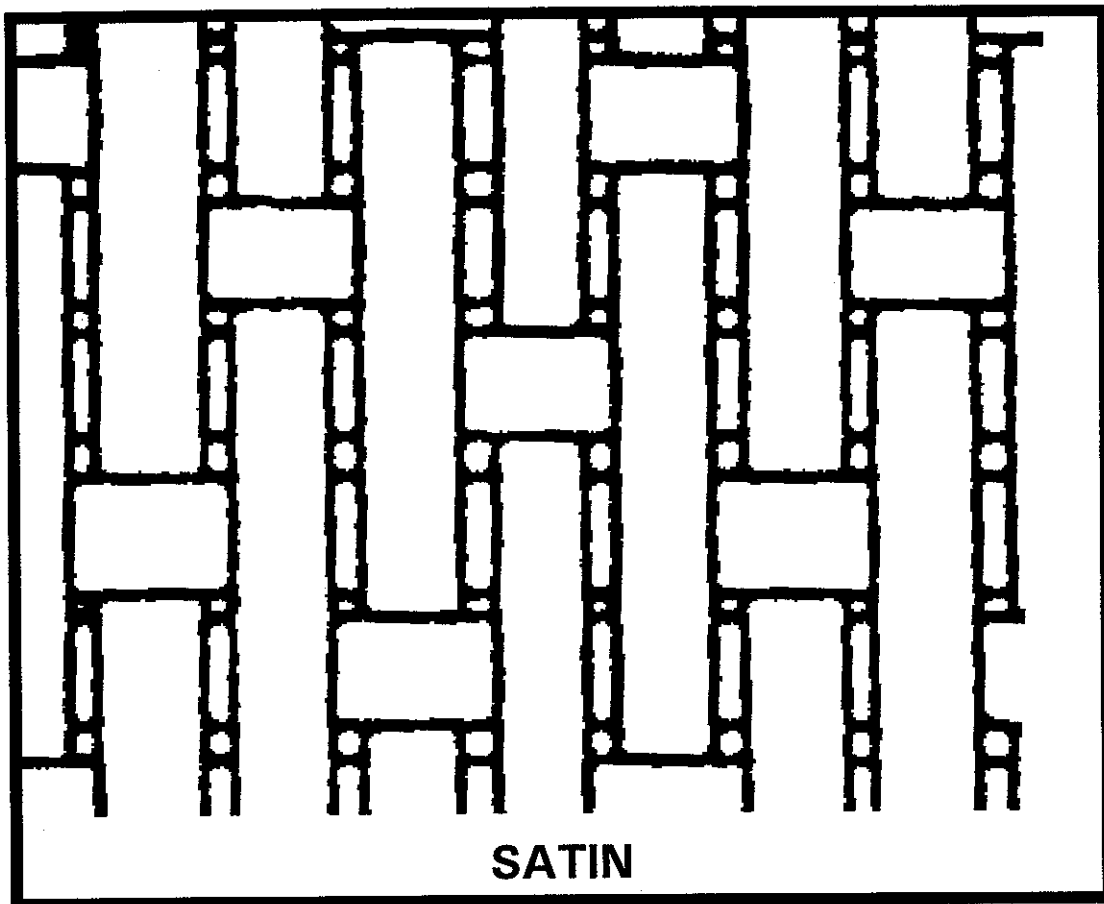
Answer Key

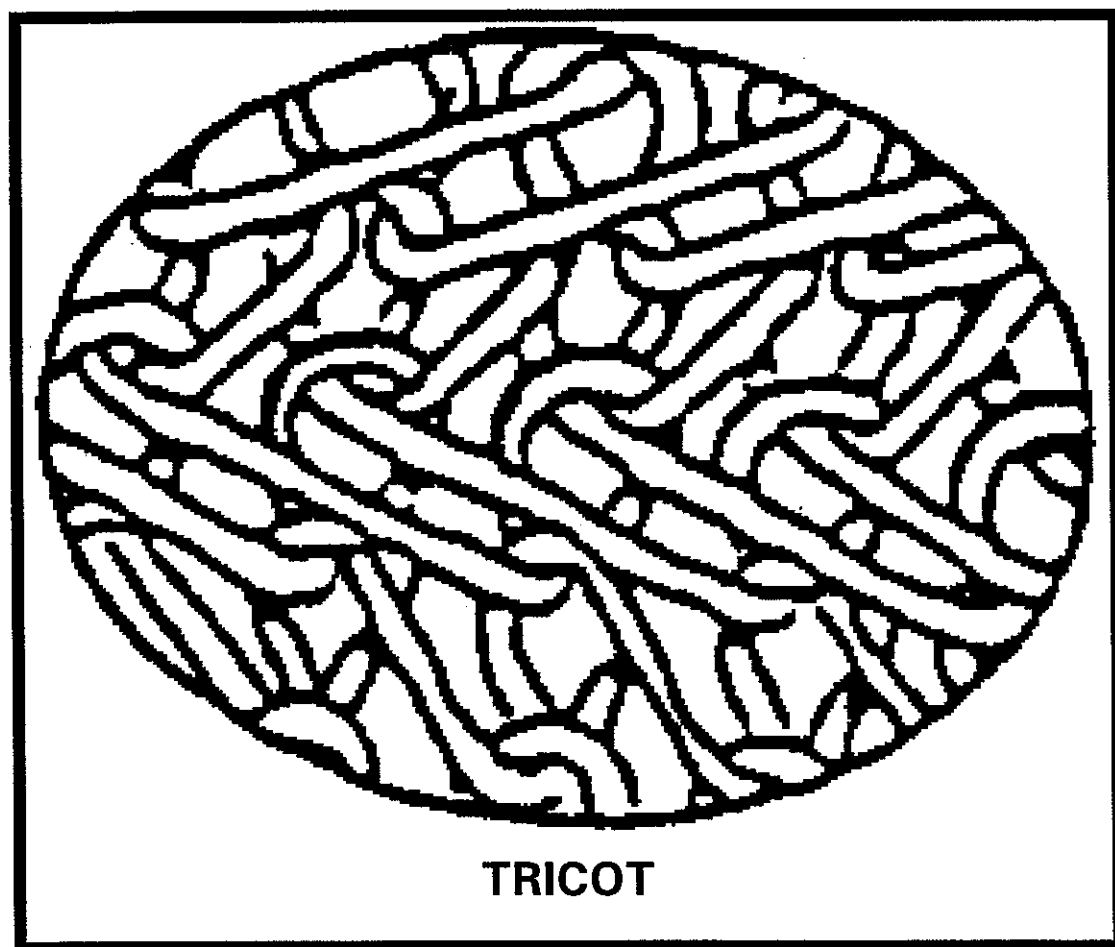
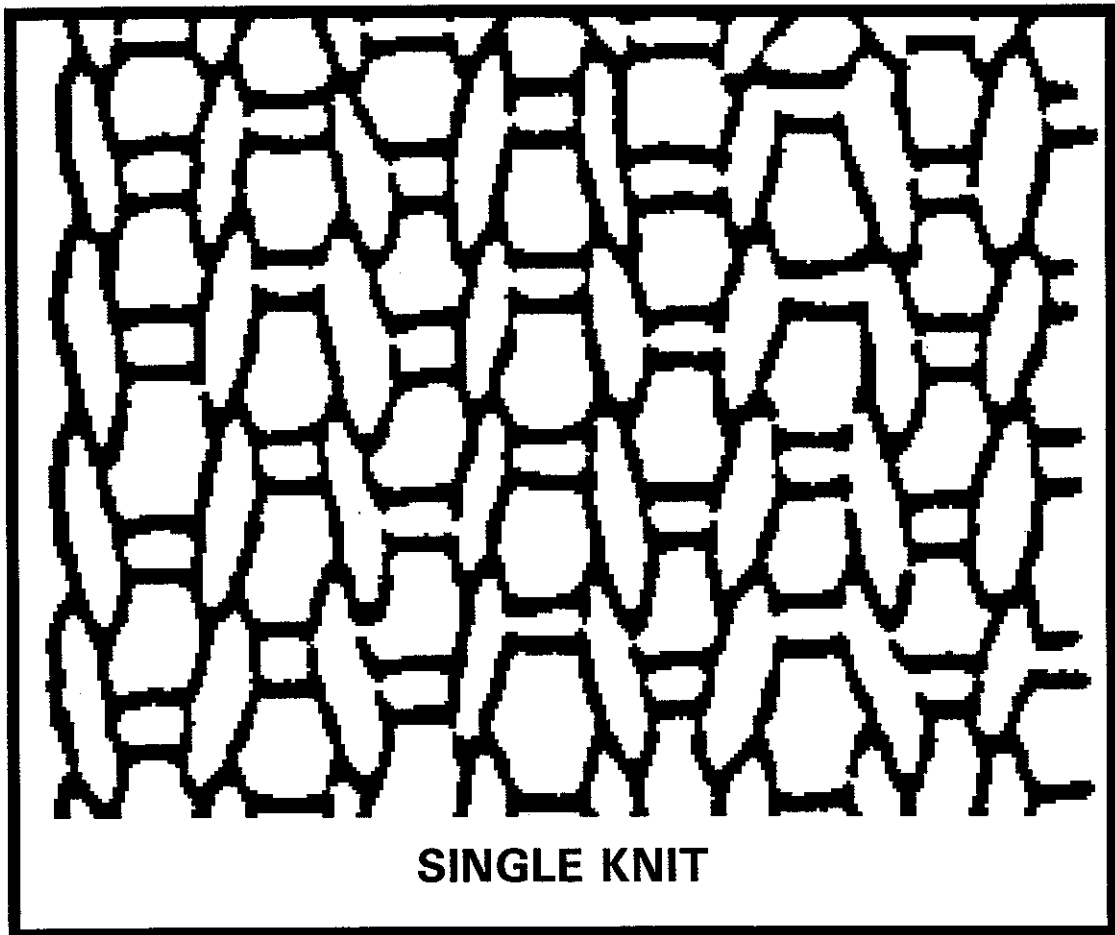
- | | | |
|---------------|-----------------|-------------|
| 1. Broadcloth | 2. Denim | 3. Sateen |
| 4. Rib Knit | 5. Oxford Cloth | 6. Corduroy |
| 7. Satin | 8. Single Knit | 9. Tricot |

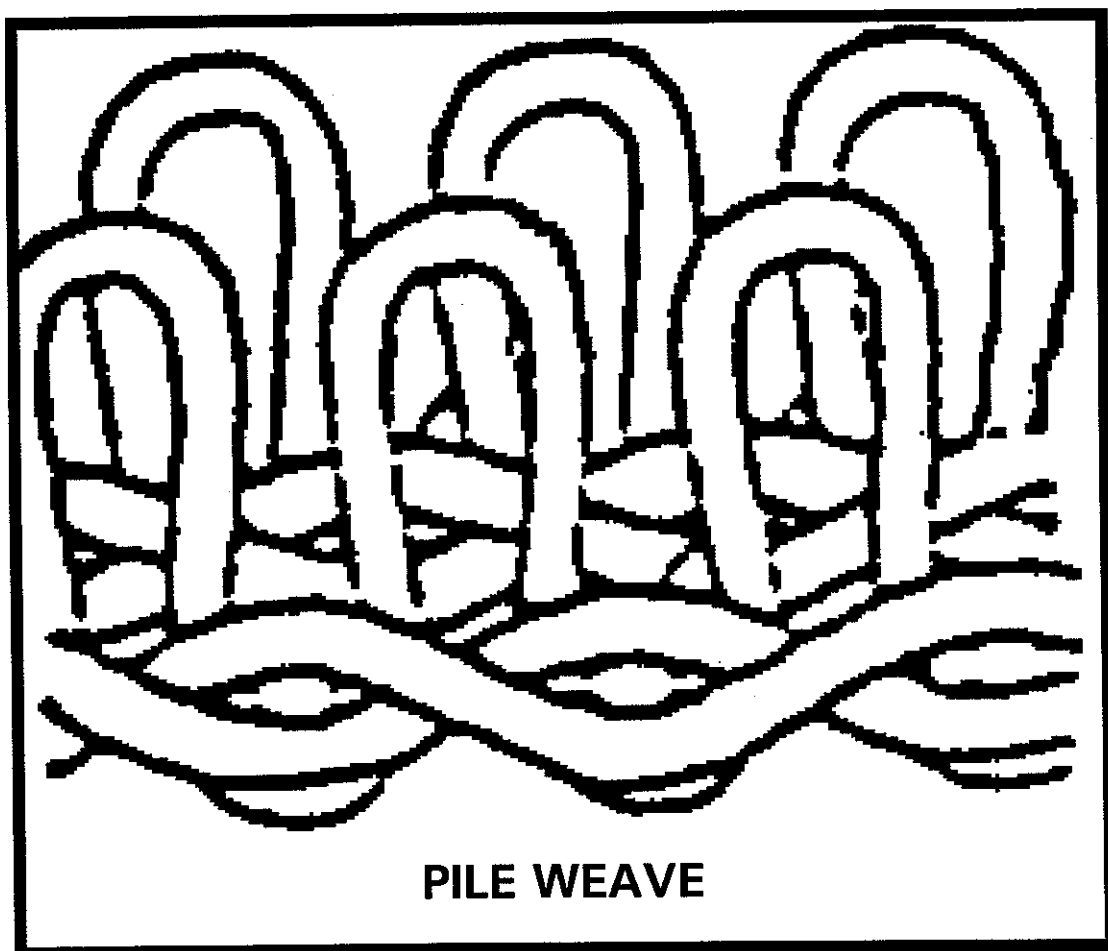
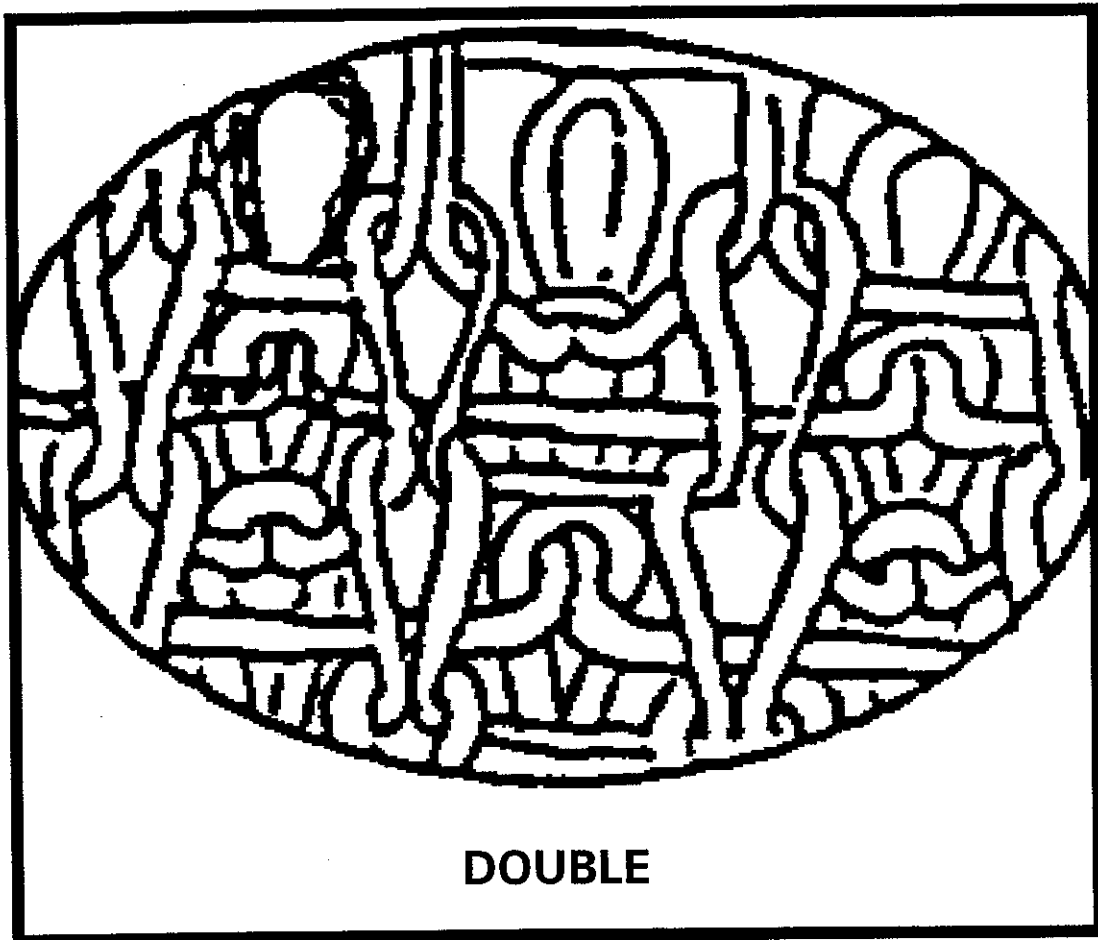
WHAT'S ITS NAME

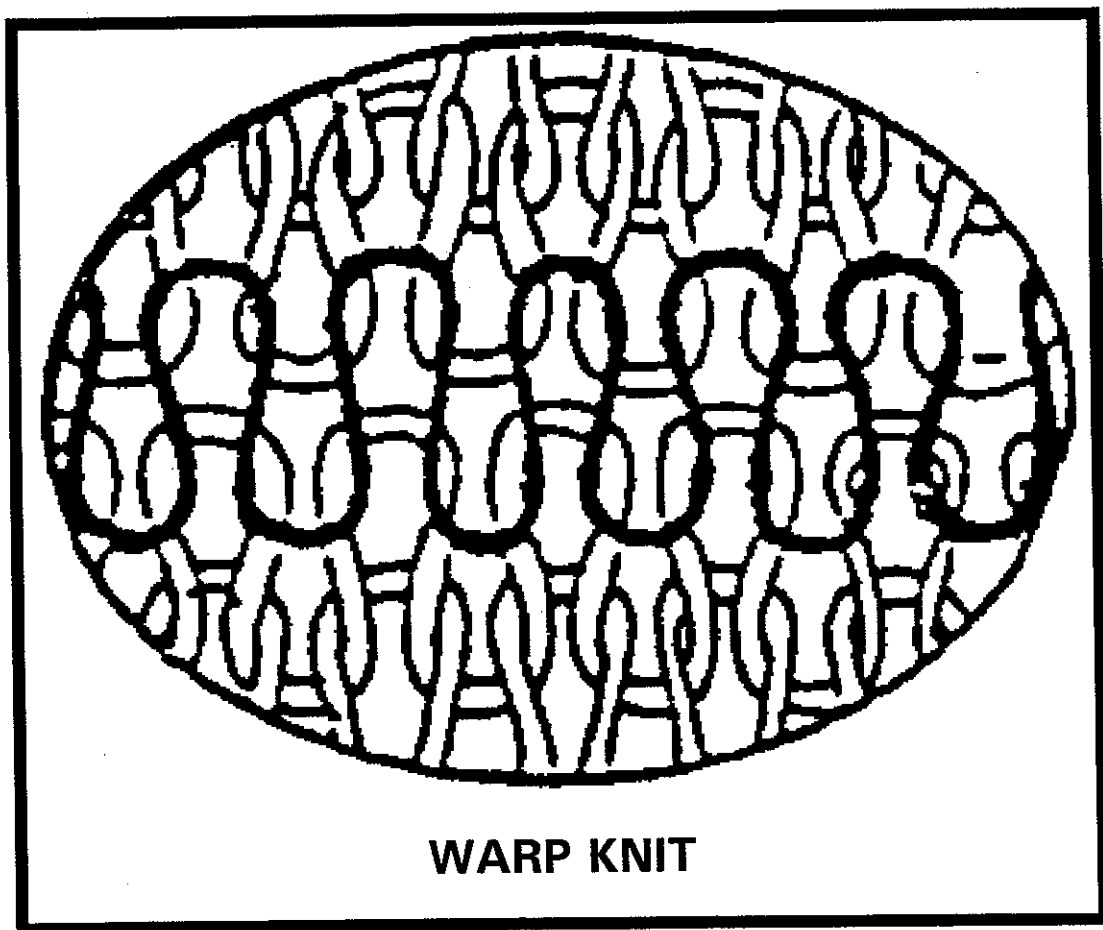
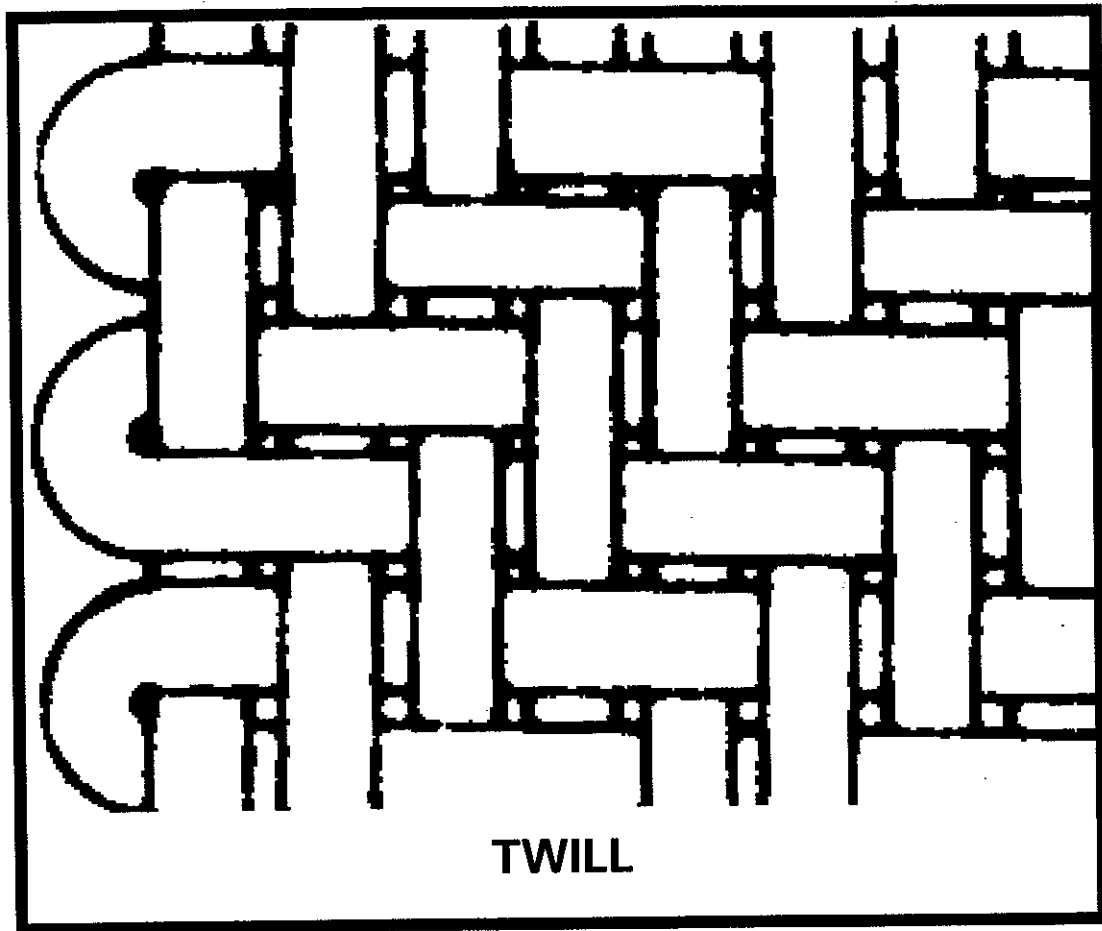
Answer Sheet

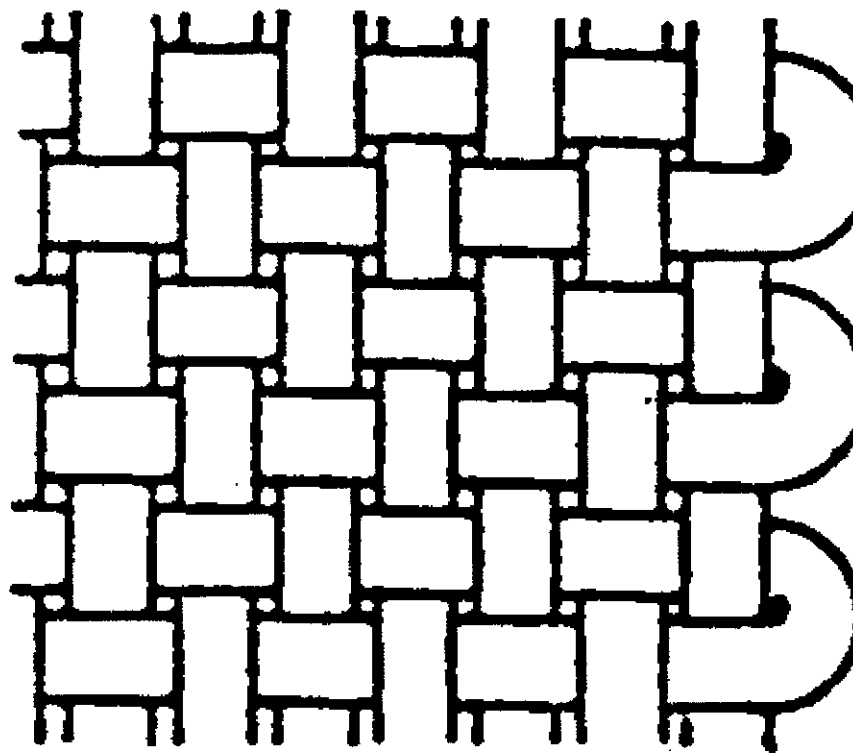
- | | | |
|------------------|-------------------|------------------|
| 1. D Plain Weave | 2. I Pile Weave | 3. G Twill Weave |
| 4. C Weft Knit | 5. B Basket Weave | 6. H Double Knit |
| 7. F Satin Weave | 8. E Single Knit | 9. J Tricot Knit |
| 10. A Warp Knit | | |



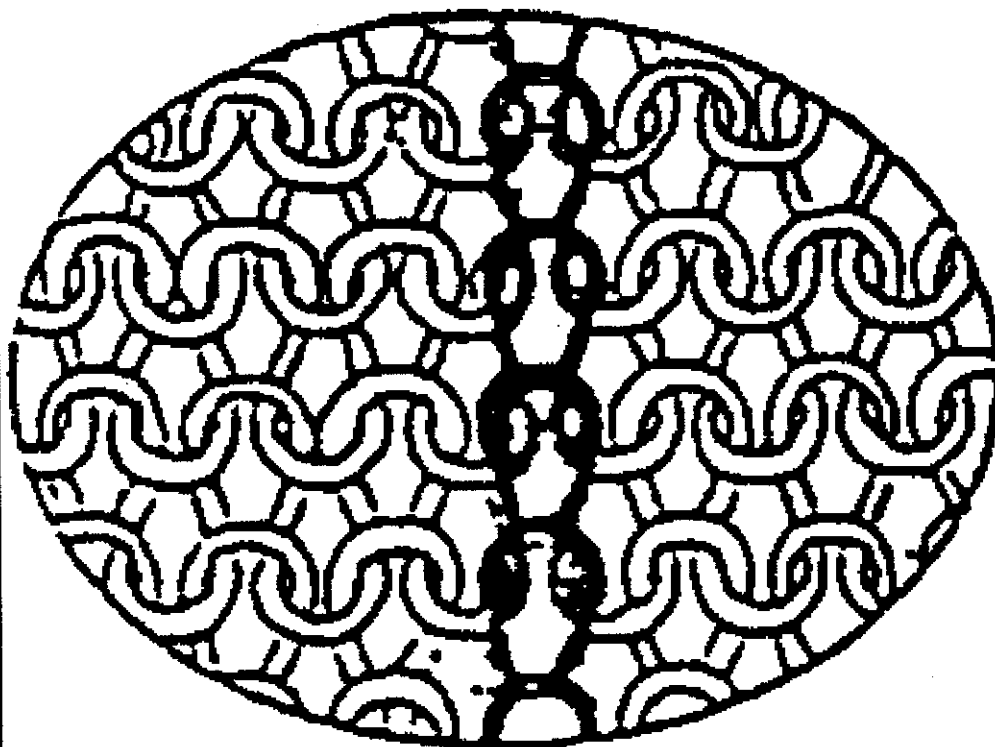






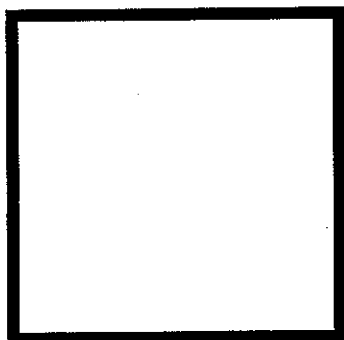


PLAIN WEAVE



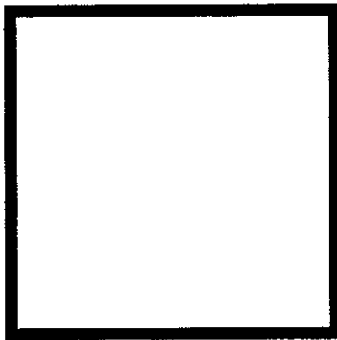
WEFT KNIT

FABRIC MATCH



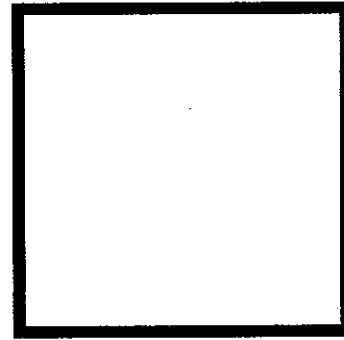
ONE OVER AND
ONE UNDER

Fabric Name: _____



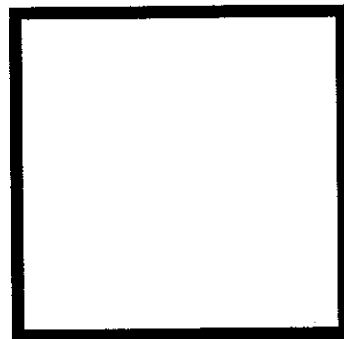
DIAGONAL PATTERN
ON WRONG SIDE

Fabric Name: _____



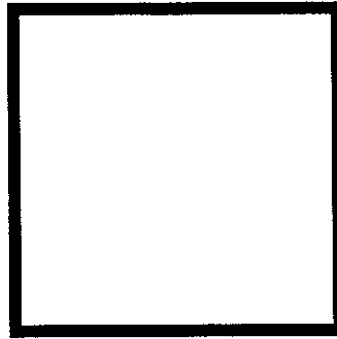
VARIATION OF
SATIN WEAVE

Fabric Name: _____



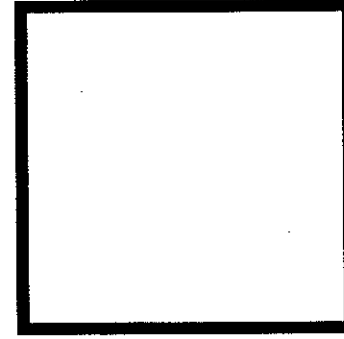
HAS RIBS ON BOTH
SIDES

Fabric Name: _____



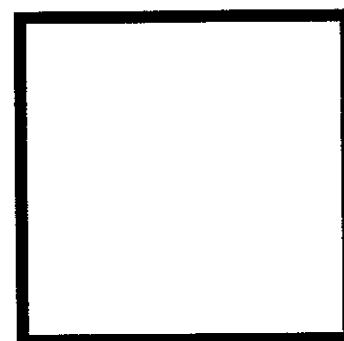
VARIATION OF PLAIN
WEAVE

Fabric Name: _____



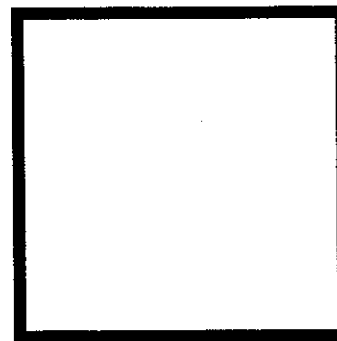
WEAVE WITH LOOPS
ON BOTH SIDES

Fabric Name: _____



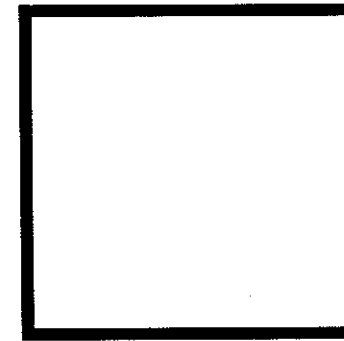
BEAUTIFUL LUSTER

Fabric Name: _____



SINGLE KNIT

Fabric Name: _____



USED TO MAKE LINGERIE

Fabric Name: _____



OBJECTIVES: For youth to:

- identify how fabrics are woven.
- demonstrate the process of weaving.

LIFE SKILL: ○ Express individuality and creativity.

MATERIALS: Old denim jeans or denim fabric
Fabric scraps of natural and man-made fabrics
Sewing machine, fabric glue or glue gun
Scissors
COASTER PATTERN
Foamboard
Pins or Tacks
Magnifying Glass
The "INS" and "OUTS" of FABRIC Workbook page 13

TIME: 30 minutes

SETTING: A comfortable room with tables and chairs.

ADVANCE PREPARATION:

Ask some youth to bring in old jeans to be recycled. (You will not need all of them to bring in denim.) Cut 4½-by-4½ inch squares of denim. Make slits in the denim ¾" apart at ½" from the top and bottom. As an option, the youth could be allowed to cut the denim themselves with assistance. Tear fabric scraps into 1-inch strips.

INTRODUCTION

Some fabrics are made by weaving yarns together. Two types of weaves are the plain weave (one over, one under) and the basket weave (two yarns over and under). We are going to have fun by weaving a coaster using denim and other fabrics.

Do

Make a COASTER!

- ◆ Give each youth a 4½ inch x 4½ inch denim square with the slits cut and various 1 inch strips of fabric.
- ◆ Demonstrate how to tack/pin denim to foamboard and then do the plain weave and the basket weave.
- ◆ Allow the youth to choose a weave, select their strips, and create their coasters.
- ◆ After the coaster is complete, the edges should then be machine stitched or glued on all sides. If gluing, allow to dry before removing from foamboard.
- ◆ Cut off any fabric that extends beyond the denim square.
- ◆ Give each participant a magnifying glass and several woven fabrics. Have them examine the fabric and look for the type of weave. They can also unravel so "they can see" how it has been woven.

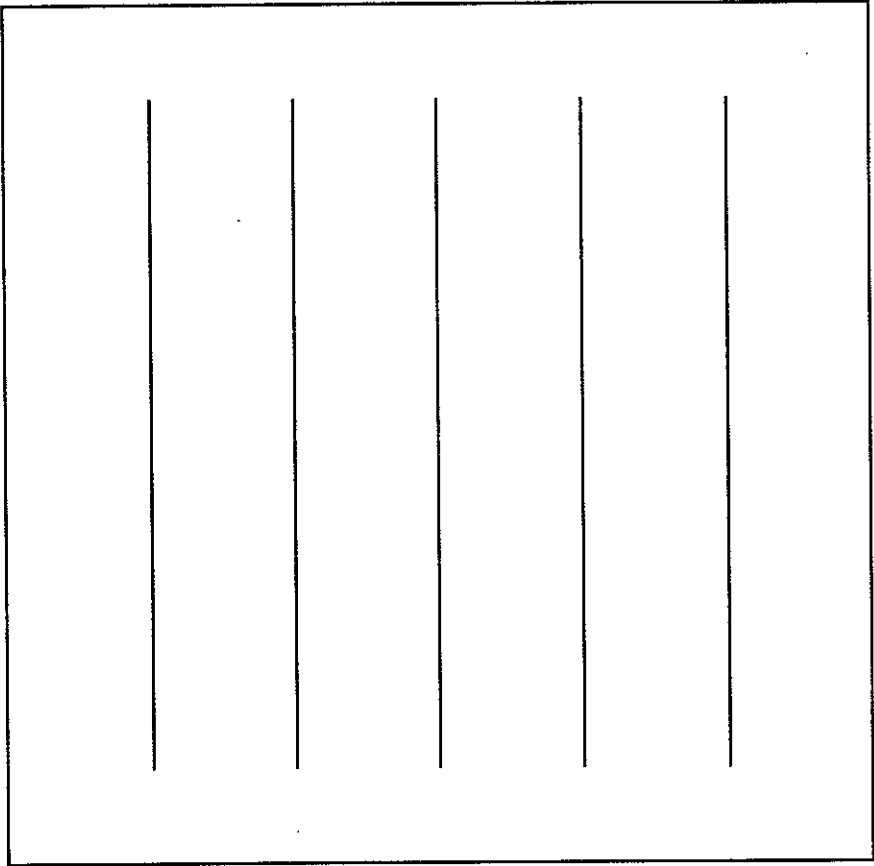
REFLECT

- ♦ What are the two main ways that fabrics can be manufactured?
by weaving or knitting yarns
- ♦ What are two types of weaves?
plain and basket
- ♦ How is a plain weave made?
one yarn under and one yarn over
- ♦ How is a basket weave made?
equal yarns of more than one over and under
- ♦ What did you learn from looking at the different fabrics under a magnifying glass?
- ♦ How did you use this information on recognizing or knowing the fabric construction?
fabric selection for garment construction; care of garments may vary by nature of fabric

APPLY

- ♦ Make a set of coasters to give as a gift. As an option, make each coaster with a different fiber content or color.
- ♦ Make a set of matching placemats.
- ♦ Look at two garments to see if you can identify the weave.

Pattern for Denim Coaster



- OBJECTIVES:** For youth to:
- learn about the characteristics of fabrics.
 - conduct and evaluate fabrics for drape and absorbency.
- LIFE SKILL:** ○ Observation, analysis and evaluation skills
- MATERIALS:** FABRIC FUN EXPERIMENTS in Workbook, page 14
Each work station will need:
- FABRIC ABSORPTION TESTS Sheet
 - Blue food coloring
 - Eye dropper
 - Water
 - Aluminum foil
 - White paper towels
 - Ruler
 - Container for colored water
 - Fabric Swatches of 100% cotton broadcloth, 100% cotton denim, 100% silky polyester, 100% acetate satin and 100% rayon
- TIME:** 30 minutes
- SETTING:** A comfortable room with tables and chairs and space for groups to work.
- ADVANCE PREPARATION:**
Color water. Make copies of FABRIC ABSORPTION TESTS. Gather supplies for each workstation.
- NOTE:** Write the names of the fabrics you've collected on small slips of paper from which each team chooses.

INTRODUCTION

Absorbency is the ability of fibers and fabrics to take up moisture. How absorbent a fabric is relates to its comfort. This is especially important for sports garments as we will discover. Let's do an experiment today with different fabrics to see how absorbent they are.

Do

Conduct FABRIC FUN EXPERIMENTS!

- ◆ Ask each youth/team to draw a slip of paper in which you have written fabric names. This determines their group and their "work" station.
- ◆ Review items at their work station such as fabrics, eye dropper, water colored with blue food coloring, aluminum foil, white paper towel, and a ruler.

LESSON 3: CUTTING EDGE

Activity 4: Fabric Fun Experiments

- ◆ Review FABRIC ABSORPTION TEST Observation Sheet so that each youth/team knows how to complete it.

VARIATION: Have youth "predict" or "hypothesize" (as scientists would) the rate of absorption before beginning. Then conduct their experiment to "test" their "hypothesis."

- ◆ Procedure:
 - Place fabric swatches 2 inches apart on white paper towel mounted on aluminum foil.
 - Drop one drop of water from a height of three inches on each fabric.
 - Write observation on the FABRIC ABSORPTION TESTS Sheet.
 - Place a white paper towel on top. Press down with fingers.
 - Write observation on the FABRIC ABSORPTION TESTS Sheet.

REFLECT

- ◆ Which fabric was the most absorbent?
- ◆ How did you make this determination?
- ◆ Which was the least absorbent?
- ◆ Which fabric quickly absorbed the water?
- ◆ Which was slow?
- ◆ What happened when you placed the paper towel and pressed down on to the fabric?
- ◆ How does fabric absorbency relate to comfort?
more absorbent (natural fibers and plant modified by chemicals) appear to be closely related to greater comfort

APPLY

- ◆ At home do the FABRIC FUN EXPERIMENTS in your Workbook, page 14 with a family member or friend.
- ◆ Share with at least two people what you learned about fabric absorbency.
- ◆ How will you use the information on fabric absorbency when you purchase clothing for active sports?

FABRIC ABSORPTION TESTS

Rate in order of absorbency. Star fabrics that are the most absorbent.

FABRIC	RATE OF ABSORBENCY (Circle the correct answer)	RESULTS	
		WATER	WHEN PRESSED
100% COTTON BROADCLOTH	FAST		
	SLOW		
100% COTTON DENIM	FAST		
	SLOW		
100% SILKY POLYESTER	FAST		
	SLOW		
100% ACETATE SATIN	FAST		
	SLOW		
100% RAYON	FAST		
	SLOW		



- OBJECTIVES:** For youth to:
- learn that not all fabrics are colorfast.
 - explore and evaluate colorfastness in fabrics.
- LIFE SKILL:** ○ Observation, analysis and evaluation skills
- MATERIALS:** Copies of TESTING FOR COLORFASTNESS Activity Sheet for each youth
Each work station will need:
- Pencils
 - Water
 - Chlorine bleach
 - Eye dropper
 - Fabric scraps of natural and man-made fibers for each youth
 - White cloth or paper towel for each youth
- TIME:** 30 minutes
- SETTING:** A comfortable room for group work at different tables.
- ADVANCE PREPARATION:**
Make copies of TESTING FOR COLORFASTNESS Activity Sheet. Find a fabric that bleeds dry and wet (some bright colors in cotton and cotton blends especially reds and blues). Gather work station materials for each group/youth.

INTRODUCTION

"Bleeding" is a word used to describe when color on a fabric "rubs off", runs or changes color. In addition, some dyes are not colorfast to chlorine bleach. Let's test some fabrics for colorfastness. "Colorfast" means the fabric dyes do not fade or "bleed."

Do

Conduct AM I COLORFAST?

- ◆ Divide youth into groups of four. Assign each group to a "work" station.
- ◆ Review their workstation materials: white cloth/paper towel, water, chlorine bleach, eye dropper, and fabric scraps.
- ◆ Give each person 3 squares of one of the fabrics. Each group will then have different fabrics to see and compare.
- ◆ Instruct them to do the three different tests for colorfastness on "their" fabric.
- ◆ Review the TESTING FOR COLORFASTNESS Activity Sheet for procedures to follow.
- ◆ Review with all groups to compare results.

REFLECT

- ◆ What is "bleeding" of a fabric?
color rubs off, runs or changes color
- ◆ Did any of the dry fabrics bleed? Which ones?
- ◆ Did the same fabrics bleed when wet?
- ◆ What happened when you used chlorine bleach?
- ◆ What did you learn from this activity?
can check dry bleeding before purchasing; be very careful when using chlorine bleach.

APPLY

- ◆ Interview three individuals who are responsible for doing the laundry about their experiences with fabrics bleeding.
- ◆ Share what you have learned with your family.

TESTING FOR COLORFASTNESS

Dry: Rub with white cloth or white paper towel.	
Fabric Tested:	Results:
Water: Dip in water. Place on white paper towel.	
Fabric Tested:	Results:
Chlorine Bleach: Place fabric on white paper towel. With an eye dropper -- drop	
Fabric Tested:	Results:

- OBJECTIVES:** For youth to:
- name textile items that are not clothing.
 - discover the extent that we depend upon textiles in everyday life.
- LIFE SKILLS:** ○ Critical thinking skills
- MATERIALS:** Story, A WORLD WITHOUT TEXTILES
Collect textile items to place around room such as toothbrush, cotton balls, billfold, soft luggage, fishing line, typewriter ribbon, map, pet collar, rope, flag, tire (toy), garden hose, baseball or tennis ball, dust mask
Paper
Pencils
Blackboard or flip chart
Markers
- TIME:** 45 minutes
- SETTING:** A comfortable room with tables and chairs.
- ADVANCE PREPARATION:**
Place items around room as inconspicuously as possible. Make copies of story.

INTRODUCTION

We live in a world of textiles. There are many things we depend on everyday that are textiles in disguise. Textiles are not used just in clothing. Today we are going to explore "our world" to see how textiles are all around us. Let's go on a scavenger hunt.

Do

Discover TEXTILES IN DISGUISE!

- ◆ Divide the youth into pairs.
- ◆ They have ten minutes to write down all the different items that use textiles they can see in the room on a sheet of paper.
- ◆ At the end of this time, compare their answers.
- ◆ List on a blackboard or flip chart the textiles they found and the ones they missed.
- ◆ Hand them the story, A WORLD WITHOUT TEXTILES.
- ◆ Circle each word that is a textile in the story.
- ◆ Count how many they found.

REFLECT

- ◆ What did you learn from this lesson?
- ◆ What was the most surprising item you found that was a textile?
- ◆ How many different textile items did your team find?
- ◆ Did you find any that were different from the rest of the group?
- ◆ What did you learn from the story?

APPLY

- ◆ Give three examples of textile items in your room that are not clothing?
- ◆ Read the story to a young friend.
- ◆ As you go home today, look for textile items that are not clothing.



A WORLD WITHOUT TEXTILES

We live in a world of textiles. You don't believe it! Then think for a minute what life would be like in a world without textiles.

We'd all be naked! NO clothes. No underwear. No stockings or socks. Not even shoes!



Animal skins would be no substitute. We'd soon kill off all the animals for their fur and hides and even then only a few people would be clothed...probably no one you know.

Of course, there's always the trees and bushes. We could strip all the foliage bare to make grass skirts, and fig leaf shorts...but what would we do when winter comes?

No, skins and leaves are no substitutes. We'd all have to move South just to survive. Think what tremendous over-crowding that would produce! I think a world without textiles would be a world without so many people on it...maybe without you!

In a world without textiles our homes would be bare, too. No carpets on the floor or drapes on the windows. No window shades! Or even Venetian blinds! Our chairs would all be hard wood. Our beds would be boards, cushioned only by straw or leaves. We'd have no blankets. No sheets. No pillows! We'd have to wash with our bare hands and shake ourselves dry.

In a world without textiles we'd ride to work on a horse or in a wooden-wheeled wagon pulled by a horse. There would be no automobiles because there would be no air-filled tires, no water hoses to cool the engine, nor wires to carry the spark to the piston! No upholstered bucket seats. No carpet on the floor boards. No convertible tops. No padded dash or even, in some cars, air scoops, bumpers or fenders.



In a world without textiles baseball wouldn't be played...not even on real grass! There would be no football, no soccer, no basketball. No tennis, no volleyball, no badminton. Croquet would be the game...a wooden ball struck by a wood mallet!

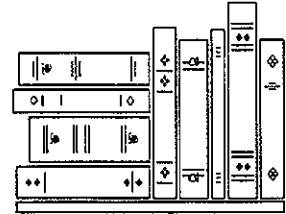
In a world without textiles there would be no space program. No astronaut could survive without their space suit. Nor could they return without the heat shield on their rocket, or even the parachute to slow their descent! Once in the water, how would they stay afloat without the flotation collar, or in an emergency, the life raft or even their own life jacket! The fact is, they'd never leave on a space flight without hoses for fueling, wires and cables for control, seat belts to hold themselves in -- even the seats themselves.





In a world without textiles many people would die without bandages, sterilized gowns and masks. Damaged or diseased arteries and wind pipes would stay damaged or diseased and the patient might die because there would be no Dacron polyester replacement. The "Iron Lung" wouldn't have saved so many polio victims. The kidney machine wouldn't be keeping so many others alive today. And the artificial heart would probably be impossible!

In a world without textiles there would be few libraries, because there would be few books...because there would be only hand-made paper. Without hundreds of thousands of tons of cheap, ready paper there would be no newspapers, no computers, no banks, no stocks, no business, except that which could be done directly, like trading a bushel of potatoes for a sack of wheat...except there would be no sack in a world without textiles.



In a world without textiles we wouldn't have progressed very far beyond the caveman, even after hundreds of thousands of years. Man's discovery of iron may have been important, but without the even earlier more important discovery of textiles and the simple textile process of weaving reeds and twisted grasses into mats and cloth, we'd all be wearing iron underwear, and that doesn't sound like much fun.

Just what is a textile? Anything woven or knitted or made into a fiber. Not just from cotton or wool or silk, or man-mades, like nylon or rayon or polyester. But fireproof spits made with asbestos fiber! Supersonic airplane parts made with carbon fiber. Space suits made with glass fiber. Artificial tendons made with stainless steel fibers. And even more fantastic things yet to come!

Yes, we live in a world of textiles...and the world we live in, we live in because of textiles!



- | | |
|-----------------------------|---|
| OBJECTIVES: | For youth to: <ul style="list-style-type: none">○ become aware of clothing that protects.○ identify and evaluate how clothing provides protection. |
| LIFE SKILLS: | <ul style="list-style-type: none">○ Critical thinking skills○ Group Cooperation skills |
| MATERIALS: | Copies of PROTECTIVE CLOTHING Activity Sheet for each youth
Pictures of protective clothing
Pencils
Paper |
| TIME: | 30 minutes |
| SETTING: | A comfortable room with tables and chairs. |
| ADVANCE PREPARATION: | Make copies of activity sheet and cut out color pictures provided or collect pictures of other uses of protective clothing. |

INTRODUCTION

Some clothing is made to protect us from special hazards. In fact one of the reasons for wearing clothing is protection -- from the sun, rain, and insects. Much of the research for the fabrics and finishes now used in protective clothing was done in the space program. As a result many people who are frequently in contact with hazardous materials have benefitted. Let's learn about some of these items of protective clothing.

Do

Identify SPACE-AGE TEXTILES!

- ◆ Instruct youth to take a piece of paper and write down as many different jobs or activities they can think of that requires special clothing.
- ◆ Next, have them get into small groups to share and compare their lists. Let each small group make a complete list to share with the larger group.
- ◆ Hand out activity sheet, PROTECTIVE CLOTHING.
- ◆ Ask youth to compare their lists and fill in as much information as possible.
- ◆ Hold up pictures one at a time.

LESSON 3: CUTTING EDGE

Activity 7: Space-Age Textiles

- ◆ Discuss why the person needs "special" clothing.
- ◆ Ask them to identify ways clothing provides that protection.
- ◆ Have them fill in or correct the information they completed earlier.
- ◆ Continue with the remainder of the pictures.

REFLECT

- ◆ What is protective clothing?
clothing worn to protect from special hazards such as fire, insects, bullets, and chemicals
- ◆ Where is much of the research done to improve fabrics and finishes?
by companies doing research for the space program
- ◆ What did you learn from this activity?

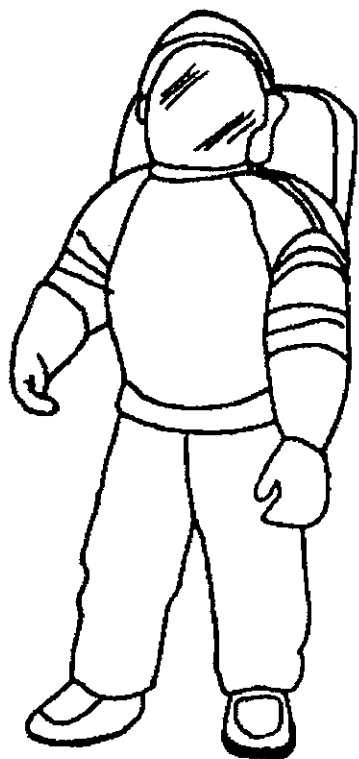
APPLY

- ◆ Interview three individuals in your neighborhood to find out if their occupation requires special protective clothing.
- ◆ Share with your family what you learned.
- ◆ Go to the library to learn more about textiles in space or other protective clothing.

PROTECTIVE CLOTHING

OCCUPATION	PROTECTIVE CLOTHING WORN	HOW ITEM PROTECTS
DOCTOR (surgery)		
SCUBA DIVER		
FIREFIGHTER		
COOK		
FOOTBALL PLAYER		
ASTRONAUT		
POLICE		
RACE CAR DRIVER		
HUNTER		
BOXER		
BABY		
FARMER		
LIST OTHER OCCUPATIONS THAT REQUIRE PROTECTIVE CLOTHING.		





ASTRONAUT



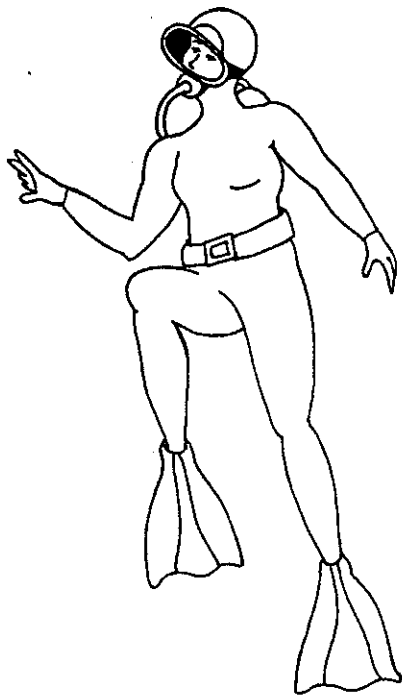
FIREFIGHTER



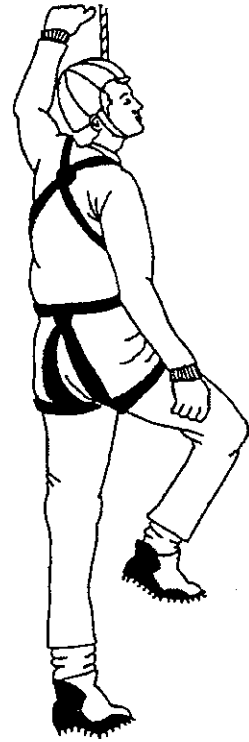
FOOTBALL PLAYER



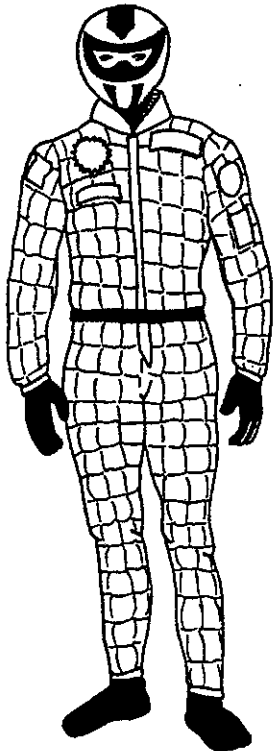
SURGEON



SCUBA DIVER



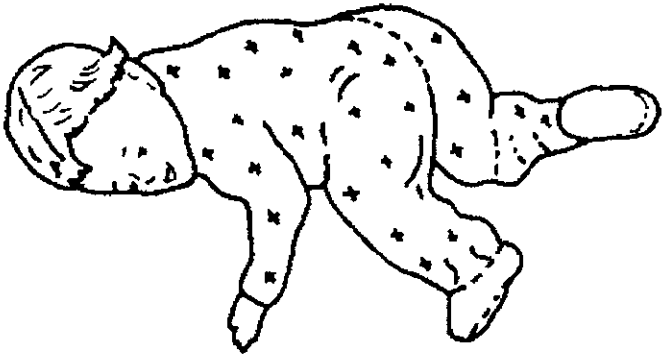
MOUNTAIN CLIMBER



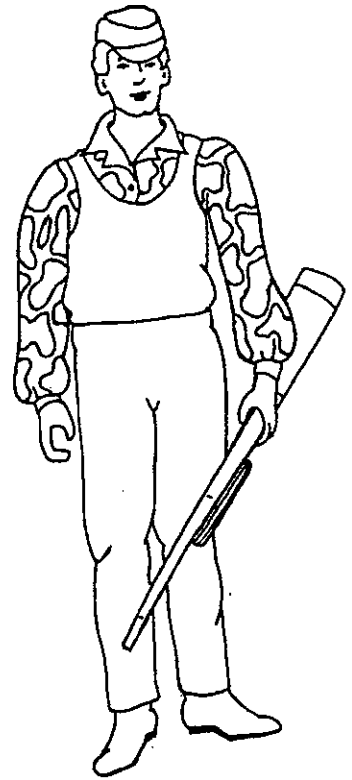
RACE CAR DRIVER



POLICEMAN OR
POLICEWOMAN



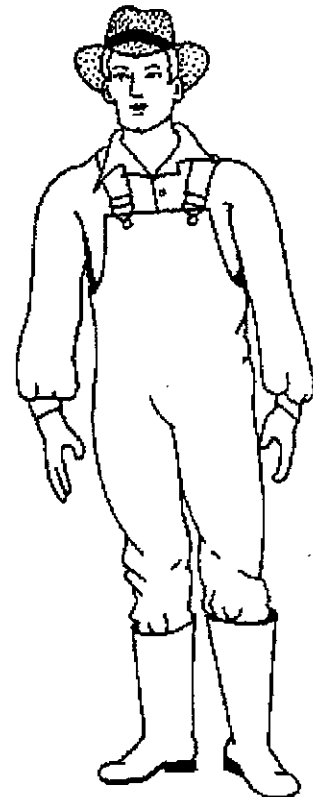
BABY



HUNTER



PAINTER



FARMER