TEXTILE MERIT BADGE

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Requirement 1 - What are Textiles?

- When you got up this morning, you lifted your head off of a pillow, threw off bed covers and stood up on your carpet. You (hopefully!) put on some clothes and sat down at a chair to go to school.
- ALL of these items are textiles
- Textile is a material made of natural or synthetic fibers

What is a Textile?

- Why are things like clothing, blankets, towels, rugs, sofas, chairs, jackets etc. Important? Why do we have them? Why did we originally CREATE them?

- Fiber – A fine, threadlike piece of material, such as cotton, jute or nylon
- Fabric – A cloth made by weaving, knitting or felting fibers
- Textile – A material made of natural or synthetic fibers

Fibers

- Natural fibers can be found from products and plants produced in the natural world. Some notable examples are:
  - Cotton – Comes from the cotton plant. Bolls grow and are collected, put through a Cotton Gin to remove the seeds and the thread can then be woven into yarn
  - Linen – Comes from the flax plant. Flax has long, thin fibers that are peeled and can then be spun into yarn

Fibers

- Wool – A fabric that comes from sheep, or other animals such as goats, muskoxen, bison, angora rabbits and yes, way back when – wooly mammoths. These fibers are collected or shorn from the animal and then cleaned and spun into yarn for use
- Silk – a natural protein fiber that is light, yet strong. Is produced by the Mulberry Silkworm during its cocooning process. It can be boiled, which separates the threads. Threads are then separated, dried and woven together

Fabric

- Fabric is what is produced by the weaving or knitting of textile fibers. When the fibers are made into a yarn or thread, those threads and yarns can be knitted or woven together into fabric.
- Weaving is interlacing the threads in order to make them stay together as a fabric
- Knitting is also interlacing, but usually is referred to when discussing wool, and also includes using interlocking loops of material.

Felting

- Felt is a type of fabric made by matting, condensing and pressing fibers together. Usually created using natural fibers such as wool and animal fur.

Requirement 2 – Get to know materials

- We are having a scavenger hunt at YOUR house!
- Find materials that you can touch and feel. You have 5 minutes!
  - 2 Natural fiber fabrics – 100% cotton, linen, wool or silk
  - 2 Synthetic fiber fabrics – nylon, polyester, acrylic, olefin or spandex (Scout uniforms are polyester….)
  - 1 Cellulosic fabric – rayon, acetate or lyocell

Requirement 2 – Get to know materials

- What are the origins and characteristics of these materials?
- Cotton – Comes from plants, shrinks when exposed to heat for the first time, does not keep you warm when its wet. Helps keep cool in the heat.
- Wool – Comes from animals, shrinks when exposed to heat or agitated, continues to keep you warm when its wet.
- Silk – Comes from animals, shrinks when exposed to heat, continues to keep you warm when its wet. Helps keep cool in the heat.

Requirement 2 – Get to know materials

- What are the origins and characteristics of these materials?

- Nylon – Very strong, elastic and lightweight fiber with good abrasion resistance. However are not good for keeping in warmth.
- Polyester – Very strong, resistant to most chemicals, stretching, shrinking and wrinkles. Quick drying and good for keeping warm
- Acrylic – Fast drying and able to have a luxurious appearance. Shrink resistant but requires dry cleaning.
- Olefin – Abrasion, stain, sunlight, fire and chemical resistant. Does not dye well but is colorfast. Has a low melting point. Is a very warm, very strong fabric. Often used in auto parts and outdoor furniture
- Spandex - Very lightweight and can be stretched over 500% of its normal size and still retain shape. Soft and supple fabric, but not great for warmth. Excellent for lightweight applications

Requirement 2 – Get to know materials

- What are the origins and characteristics of these materials?

- Rayon – Rayon is made from purified cellulose fibers – wood pulp – the same thing as paper. It does need certain chemicals to exist and stay whole, so it is considered semi-synthetic. Is not durable, so must be hand – washed.
- Acetate – Much like Rayon, Acetate fiber is made from spun cellulose fiber, and mixed with other fibers to increase its strength. Often used for drapes and curtains because of its shiny and soft look. It rips easily, has a low melting point, is easily wrinkles and must be dry cleaned.
- Lyocell – Also made via wood pulp, the chemical amine oxide is added to produce a liquid which is spun through spinnerets and the fibers emerge. The basic fabric is soft, hypoallergenic and is 50% more absorbent than cotton. The main advantage is that amine oxide is non-toxic and has a 99.5% reuse potential, allowing it to be used over and over.

Requirement 2B

- Give the origin, major characteristics and content of each type of fiber you obtained for 2A.

- A Cellulosic Manufactured Fiber come from plants that are processed into a pulp and then extruded in the same ways that synthetic fibers such as polyester or nylon are made. Rayon is a common Cellulosic Manufactured Fiber.

- Synthetic Manufactured Fiber come from synthesized polymers of small molecules. These compounds are usually made from raw materials such as petroleum based chemicals. Examples include rayon and nylon.

Requirement 2C

- Describe the main steps in making raw fiber into yarn, and yarn into fabric

- Step one is obtaining raw fiber, such as from this Angora Rabbit

Requirement 2C

- Describe the main steps in making raw fiber into yarn, and yarn into fabric

- Step 2 is washing and cleaning that raw fiber, a process called picking and carding. Eventually you then spin that fleece into yarn

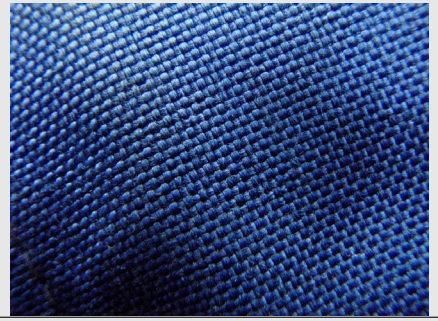
Requirement 2C

- Describe the main steps in making raw fiber into yarn, and yarn into fabric

- Finally, that yarn is spun into fabric that can be cut, dyed etc.

Requirement 2D

- Assume you will soon buy a new garment or other textile item. What fiber or blend of fibers do you want the item to be? Why?



End of Day 1

- Homework – Requirement 1 and 2

Requirement 3 – We are doing 3E and 3F

- Requirement 3E – Make two natural dyes and use them to dye a garment or a piece of fabric
- Items needed: Coffee, a pot, a wet shirt to dye
- Submerge the shirt, be sure is weighed down to stay under the coffee using a bowl or spoons.
- Leave in the coffee for up to 24 hours. The longer it stays in the coffee, the more it will be dyed
- Rinse item before using.

Requirement 3 – We are doing 3E and 3F

- Requirement 3E - Make two natural dyes and use them to dye a garment or a piece of fabric
- Items needed: Coffee, a pot, a wet item to dye
- Materials needed: A pot to boil water, the skins of many onions, white vinegar
- Wash the onion skins. Then put the onion skins in water and bring to a boil. Once boiling, allow to simmer for an hour
- Allow to dye in the bath for 10 minutes to an hour
- Soak the fabric you want to dye in a vinegar water solution of 4 parts water to 1 part vinegar for 30 – 45 minutes. When done, rinse with clean water
- Strain the onion water into a container and place the prepared garments into the water. Also to soak overnight
- Rinse item before wearing.

Requirement 3F

- Requirement 3F – Waterproof a fabric
- You will need: The item you want to waterproof, a candle you can remove from a candleholder, or a bar of soap and a blow dryer
- Rub the candle or the soap firmly on the item, when completed, run your blow dryer over the item to melt the wax / soap.
- Its now waterproof!

End of Day 2

- Homework – Requirement 3 E and 3F
- We will share them on Day 4

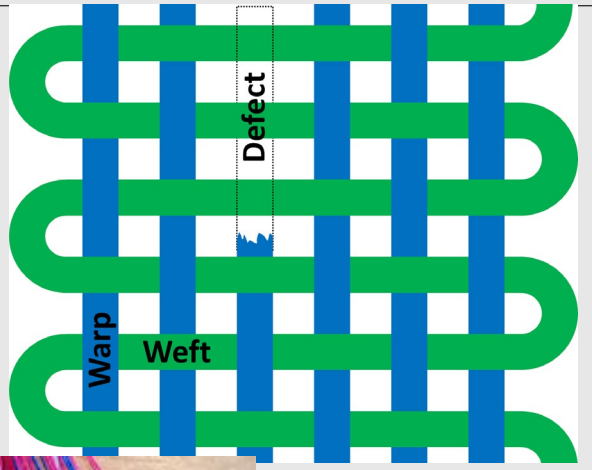
Requirement 4

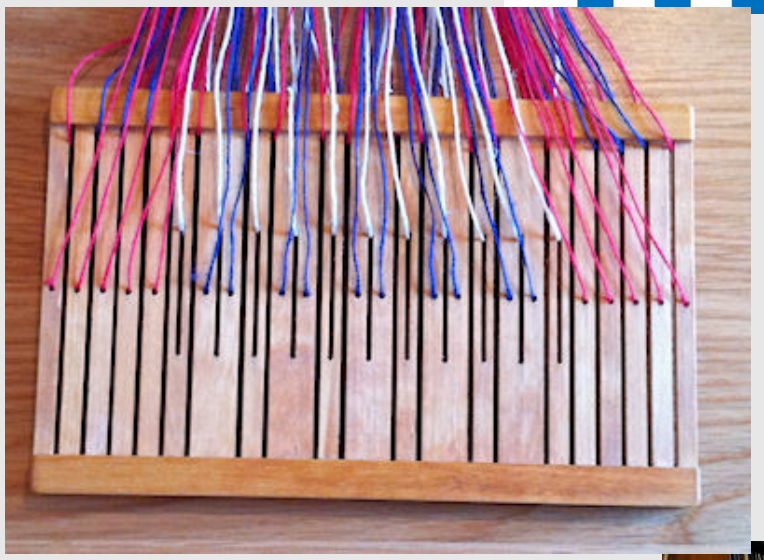
- Explain the meaning of the following terms:

- Warp – Warp and Weft refer the orientation of woven fabric. The warp direction refers to the threads that run the length of the fabric

- Harness – The Harness, or Shaft is the frame of the loom that holds the warp threads. These shafts can be moved up or down by treadles to create a pattern using the Weft

- Heddle – An integral part of the loom, each thread in the warp passes through a heddle, which us used to separate the warp threads for the passage of weft threads. Usually made of cord or wire





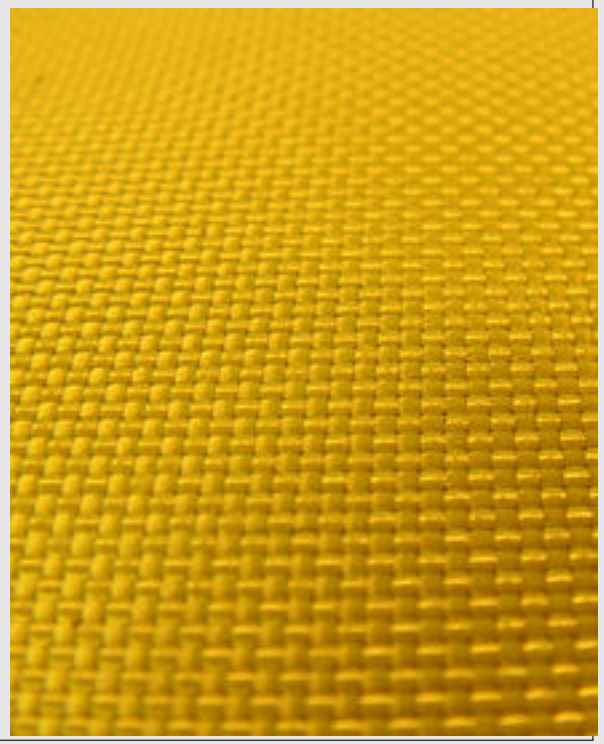
Requirement 4

- Explain the meaning of the following terms:

- Shed – When weaving, the shed is the temporary separation between upper and lower warp yarns through which the weft is wove. The shed is created to make it easier to interlace the weft into the warp to create woven fabric.

- Aramid – Aramid fibers are a class of heat resistant and strong synthetic fibers used in aerospace and military applications. Many times as body army, cordage and ballistic composites

- Sliver – In yarn production, sliver is the loose, soft, untwisted ropelike strand of textile fiber with uniform thickness that is produced by the carding process.



Requirement 4

- Explain the meaning of the following terms:

- Yarn – A long continuous length of interlocked fibers, suitable for the use in production of textiles via weaving, knitting or otherwise. Thread, is a specific type of yarn.

- Spindle – A straight spike, usually made from wood used for spinning and twisting material such as wool, flax or cotton into yarn

Requirement 4

- Explain the meaning of the following terms:

- Distaff – A tool used in spinning designed to hold unspun fibers. Fibers are wrapped around the distaff and then spun on to the spindle. Its like a third hand!

- Worsted – A high quality type of wool yarn, as well as wool weight category. Worsted wool us typically used for making tailed garments such as suits and trousers. Woollen wool is used for sweaters, socks etc.

Requirement 5

- List the advantages and disadvantages of natural plant fibers, natural animal fibers, cellulosic manufactured fibers, and synthetic manufactured fibers. Identify and discuss at least four ecological concerns regarding the production and care of textiles

- Advantages of Natural Plant Fibers
  - Cheap
  - Easy to obtain
  - Absorbs sweat and water to keep you cool
  - Fire resistant
  - Less environmental Impact

- Disadvantages of Natural Plant Fibers
  - Not durable
  - Heavy in weight
  - Damaged by moths and insects
  - Can wrinkle
  - When wet, does not insulate body heat

Requirement 5

- List the advantages and disadvantages of natural plant fibers, natural animal fibers, cellulosic manufactured fibers, and synthetic manufactured fibers. Identify and discuss at least four ecological concerns regarding the production and care of textiles

- Advantages of Natural Animal Fibers
  - Cheap
  - Easy to obtain
  - Absorbs sweat and water to keep you cool
  - Fire resistant
  - Less environmental Impact
  - Insulates body heat when wet

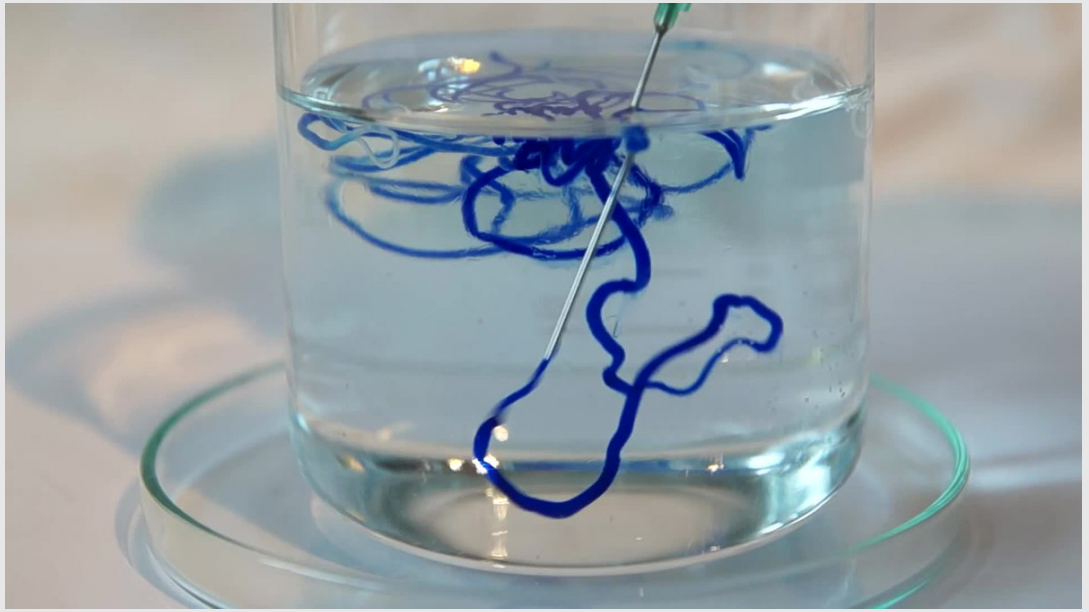
- Disadvantages of Natural Animal Fibers
  - Not durable
  - Heavy in weight
  - Damaged by moths and insects
  - Can wrinkle
  - Ethical concerns

Requirement 5

- List the advantages and disadvantages of natural plant fibers, natural animal fibers, cellulosic manufactured fibers, and synthetic manufactured fibers. Identify and discuss at least four ecological concerns regarding the production and care of textiles

- Advantages of Cellulosic Manufactured Fibers
  - Silky appearance
  - Breathable
  - Inexpensive
  - Easily dyed

- Disadvantages of Cellulosic Manufactured Fibers
  - Creases easily
  - Environmental concerns
  - Hard to manufacture



Requirement 5

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- Advantages of Synthetic Manufactured Fibers
  - Easy to dye
  - Lightweight
  - Does not shrink
  - Sun resistant
  - Durable
  - Water resistant / waterproof

- Disadvantages of Synthetic Manufactured Fibers
  - Does not breathe well
  - Not absorbent
  - Fabric ‘shine’
  - Slippery feel

Requirement 5

- Identify and discuss at least four ecological concerns regarding the production and care of textiles
  - When creating and dying fibers, chemicals and water are used which can pollute rivers and lakes
  - When creating cellulosic fibers, trees are harvested and over logging can be an issue
  - Use of petroleum products in creating synthetic fibers and those pollutants
  - Use of pesticides and fertilizer on cotton and flax farms
  - Chemicals used to bleach and dye materials must be removed from water
  - Greenhouse gasses emitted by livestock animals and ethical concerns on use of wool

Requirement 6

- Explain to your merit badge counselor, either verbally or in a written report, five career possibilities in the textile industry. Tell about two positions that interest you the most and the education, cost of training, and specific duties those positions require

- Career options can include:
  - Cloth inspector
  - Dyeing Supervisor
  - Textile Designer
  - Pattern Maker
  - Weaver
  - Sales Representative
  - Retail Salesperson
  - Costume Creator
  - Dry Cleaner
  - And many, many more!

End of Day 3

- Homework – Requirement 4, 5 and 6
- Be Ready to present Requirement 6 tomorrow in class and Share your dyed / waterproofed items!