



# Threads Crossing the Warp

## MODULE 3

### Plants and raw materials used in weaving



Partners



ΧΑΡΟΚΟΠΕΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ  
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# TEXTILES & FIBRES

- Textiles/fabrics are made of fibres.
  
- The origin of fibres may be:
  - ✓ vegetable (cotton, flax, bamboo, jute)
  - ✓ animal (wool, silk)
  - ✓ synthetic (nylon, polyester, acrylic) or
  - ✓ mineral (glass fibres)
  
- In the past, all fibres came from the nature (sheep, plants, etc.), but in the 20th century oil products and synthetic textile fibres began to be produced.

# RAW MATERIALS USED IN WEAVING

- Thus, when choosing raw materials, we have to consider between three main groups:
  - ✓ Natural fibres - vegetable fibres, such as cotton, linen, etc.
  - ✓ Animal fibres, such as wool and silk
  - ✓ Chemical fibres - made from both natural and chemical substances.
- Fibres have different properties according to where they come from.

# PLANTS USED IN WEAVING: COTTON

- **Cotton** is the oldest and most common natural fibre.
- The cotton plant is native to the tropical and subtropical regions of North America, central and South America, Egypt and India.
- Cotton belongs to the Malvaceae family and the genus *Gossypium*, which comprises approximately 45 herbaceous and woody perennial wild species.

*(cited in Bouchaud, Yvanez, & Wild, 2019, p. 3)*

# PLANTS USED IN WEAVING: COTTON

Figure 4: *Gossypium arboreum*, Las Chapatales (Sevilla), Spain. (A) Cotton fruit: immature (right) and mature (left). (B) Modern cotton seed after ginning process, with short fibres (“fuzz”) still attached



*Bouchaud, Yvanez & Wild, 2019, p. 9*

Photos C. Bouchaud

# PLANTS USED IN WEAVING: COTTON



<https://www.cottonacres.com/wp-content/uploads/2015/11/cotton-flower-pink.jpg>



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<https://commons.wikimedia.org/w/index.php?curid=64246292>



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<https://commons.wikimedia.org/w/index.php?curid=15498481>

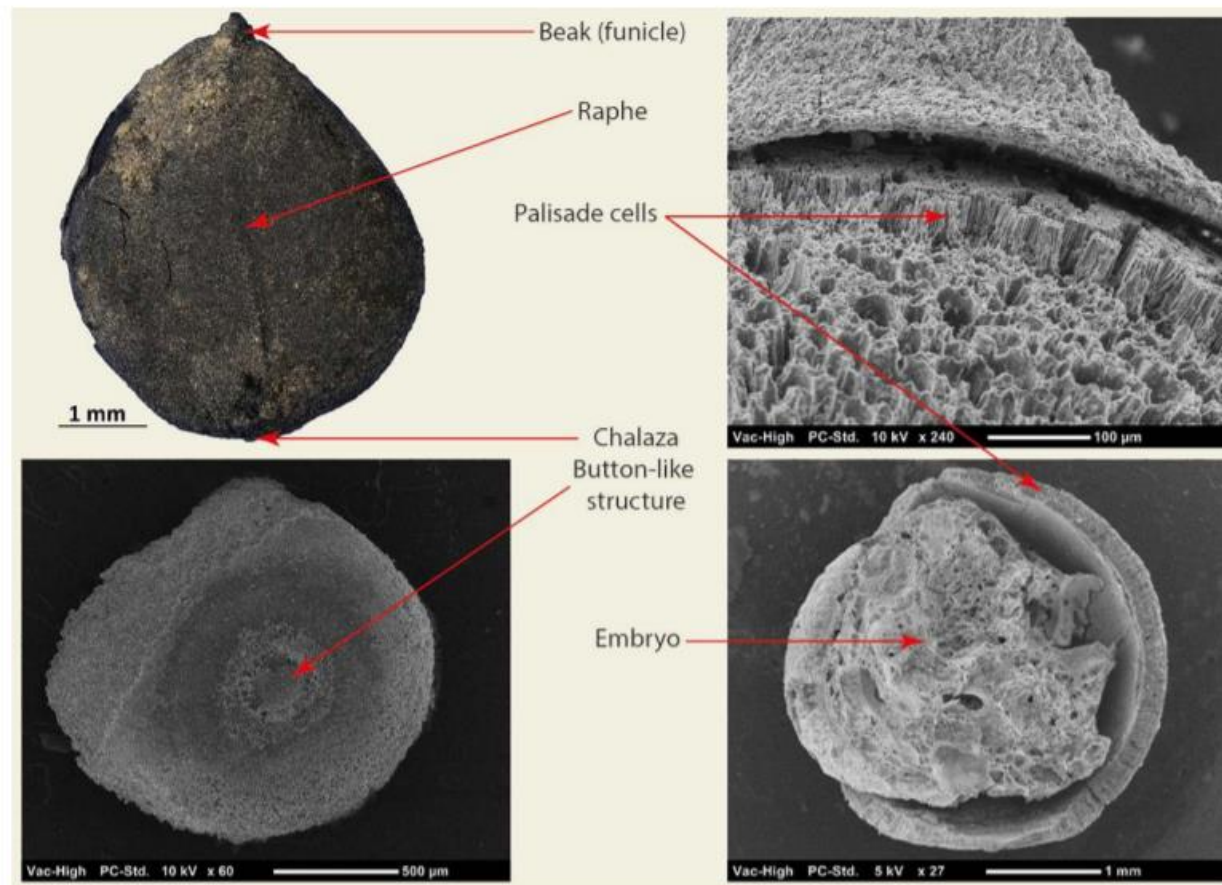
# PLANTS USED IN WEAVING: COTTON

- Behind the unity of the term "cotton" lie complex trajectories, involving four species domesticated at different times and in different parts of the world.
- Two species were domesticated in the Old World, *G. herbaceum* in Africa, and *G. arboreum* on the Indian subcontinent. They were supplanted from the 19th century onwards by American cotton, which offered better qualities for textile production. Currently, the most widely used cotton is *G. hirsutum*, a very productive species native to Mesoamerica.
- The second New World species, *G. barbadense*, from South America (Peru), is known as “Egyptian cotton”, characterised by its extra-long fibres and today produced in Egypt

*(Brubaker et al. 1999, Page et al. 2013, Wendel & Cronn 2003)*

# PLANTS USED IN WEAVING: COTTON

Figure 7: Archaeological cotton seeds. Whole (up left) and fragmented (up right and bottom), from Mada'in Salih, Saudi Arabia (1<sup>st</sup>-3<sup>rd</sup> c. CE)



*Bouchaud, Yvanez & Wild, 2019, p. 12*

Digital microscope photo C. Bouchaud, SEM photos M. Lemoine, J. Milon.



# PLANTS USED IN WEAVING: COTTON

- The cotton fibre grows around the seeds of the plant.
- The fibre consists mainly of cellulose. These cellulose fibres are spun into threads for the textile industry.
- First, all of the leaves, stems and dirt must be removed, by using blowers and cleaning machines. Historically, this involved **willowing**, **scutching**, and **lapping**.
- During **willowing**, the cotton was placed in a revolving drum and forced air separated the cotton from waste products.
- Then, the **scutching** machine beat the cotton with blades and pushed it over cylinders with spikes to clean it more. This step is done today by circular saws that have small teeth that separate out the seeds, leaving what is called “lint.”
- **Lapping** squeezed the fibers into a sheet for carding.

# PLANTS USED IN WEAVING: COTTON

- Originally done by hand using wire-bristled brushes, spiked carding machines remove the last of the waste and dirt and pull the fibers parallel to each other. The high-speed, wire-toothed rollers turn the fibers into what is called **sliver**. Next, the sliver is pulled between rollers to create slightly twisted **roving**, which is wound onto spindles.
- Contemporary **spinning machines**, which replaced the spinning mule, pull, stretch and twist to take the cotton to the thread stage.

# PLANTS USED IN WEAVING: COTTON

- Nowadays, cotton yarn accounts for about half of the world's textile fibre production, despite the wide use of manufactured fibres.
- At the beginning of the century the total harvest of cottonseed exceeded four million tons, in the 1950s it reached eight million tons, and in the early 1960s it reached eleven million tons.
- The countries with the higher production of cotton are the United States, China, India, and the former Soviet republics of Central Asia, and to a lesser extent Australia, Brazil, and Egypt.

# PLANTS USED IN WEAVING: COTTON

- Cotton is a highly **durable fibre** with the ability to absorb moisture.
- Cotton threads or cotton fabrics are often used for underwear and summer clothes.
- The **disadvantages** of cotton are:
  - ✓ It tends to wrinkle
  - ✓ It often shrinks
  - ✓ It isn't dimensionally stable
- Therefore, cotton is often blended with chemical fibres to reduce shrinkage and wrinkling.

# PLANTS USED IN WEAVING: COTTON

- How Cotton Processing in Factory, Cotton Cultivation - Cotton Farming and Harvest ->

<https://www.youtube.com/watch?v=BofeiKsE5pU>

- Growing, Spinning and Weaving Cotton ->

[https://www.youtube.com/watch?v=4SwpKoy\\_HK8](https://www.youtube.com/watch?v=4SwpKoy_HK8)

- How I process cotton entirely by hand ->

<https://www.youtube.com/watch?v=gECT5NGS3nl>

# PLANTS USED IN WEAVING: LINEN

- **Linen** is more expensive than cotton and is used for finer textiles.
- The linen fibres are made from the flax plant.
- The plant is native to Europe.
- The usable flax fibres are extracted from the bast or skin of the stem of the flax plant.
- Flax fibre is soft, lustrous and flexible. It's stronger than cotton fibre, but less elastic.

# PLANTS USED IN WEAVING: LINEN



<https://www.linenbeauty.com/blog/some-history-from-flax-plant-to-linen-fabric>



<https://blog.seasaltcornwall.com/story-linen-field-fabric/>



<https://blog.seasaltcornwall.com/story-linen-field-fabric/>



<https://blog.seasaltcornwall.com/story-linen-field-fabric/>



By Joep Vogels, Textielmuseum Tilburg -  
Textielmuseum Tilburg, CC BY-SA 4.0,  
<https://commons.wikimedia.org/w/index.php?curid=39160925>

# PLANTS USED IN WEAVING: LINEN

- Linen is a highly durable cloth.
- It has a natural shine.
- Linen does not shrink, and it absorbs moisture.
- Linen wrinkles but the clothes remain dimensionally stable.
- Linen is often used for summer clothes because of the cooling effect on the skin.
- Its heat resistance makes it possible to wash the cloth at 95°. This makes linen useful for sheets, pillowcases, napkins and tablecloths.
- We can weave linen with other fibres, for example, where the warp is from linen and the weft from cotton.



# PLANTS USED IN WEAVING: LINEN



# PLANTS USED IN WEAVING: LINEN

Making Linen Fabric from Flax Seed - Demonstration Of How Linen Is Made ->

<https://www.youtube.com/watch?v=TFuj7sXVnIU>

Making Irish Linen & Vintage Flax farming - Traditional Crafts of Ireland Documentary ->

<https://www.youtube.com/watch?v=tqntI3Ec8Ew>

# PLANTS USED IN WEAVING: HEMP

- It comes from the **hemp** plant that produces quite thick yarns.
- Hemp has been used to make fabric for thousands of years.
- It's one of the most sustainable fibres in the world, and an excellent alternative to linen.
- Hemp (Cannabis) fibres also manufactures ropes, bags and nets.

# PLANTS USED IN WEAVING: HEMP



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<https://commons.wikimedia.org/w/index.php?curid=7558724>



By User:Natrij - Own work, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=2304060>

# PLANTS USED IN WEAVING: HEMP

- Hemp plants mature in just 80-120 days, reaching heights of up to 15 feet with little or no fertiliser needed. They have a deep-root system, which helps prevent soil erosion, removes toxins, and aerates the soil to the benefit of future crops.
- Once mature, the plant is cut and goes through ‘retting’. This is a process of decay, where the outer layer is removed, exposing the long, inner ‘bast’ fibres. These fibres are what make up the textile material used to make hemp clothing.
- The woody cores are then removed through decortication.
- The hard, scratchy biopolymer called ‘lignin’ is removed, resulting in a far softer, smoother yarn.
- Lastly, the yarn is spun similarly to other natural fibres; the bast fibres get twisted together to form long threads. These are then spun and woven into a fine, linen-like fabric.

# PLANTS USED IN WEAVING: HEMP



<https://sensiseeds.com/en/blog/hemp-plastic-what-is-it-and-how-is-it-made/>

<https://fashionunited.com/news/business/sustainable-textile-innovations-hemp-fibres/2017071016501>



<https://whatishemp.com/products/hemp-clothes/>

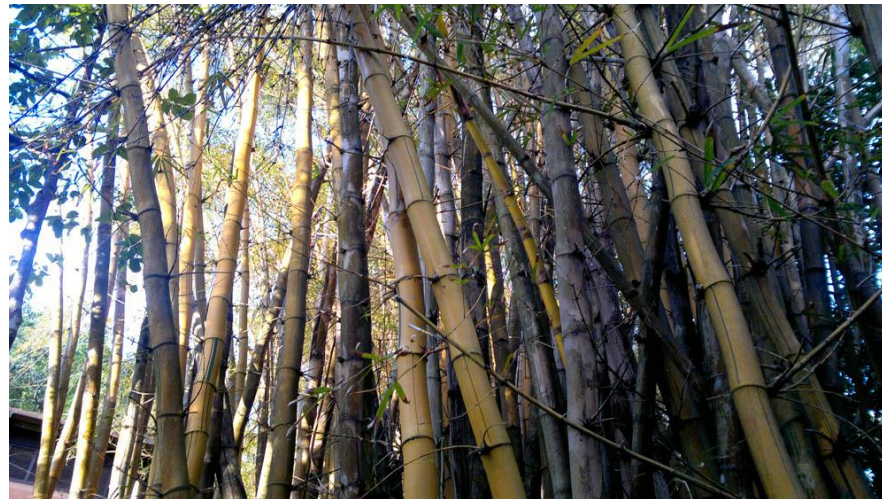
# PLANTS USED IN WEAVING: BAMBOO

- **Bamboo** is a natural resource that can be crafted into a soft fabric.
- It was first used for clothing in the 20th century and was initially manufactured in China.
- Bamboo is naturally pest-resistant and can help rebuild eroded soil. It can grow organically without chemical fertilisers, herbicides or pesticides.
- It takes just 3 months to reach its maximum height. The root network is so large that once harvested, bamboo doesn't need replanting; instead, it shoots straight back up again.
- Sodium hydroxide and carbon disulphide are used to process bamboo plant into fibre. The leaves and woody shoots get soaked in these chemicals; a process also known as hydrolysis alkalisation.
- Now heavy and pulped, the bamboo solution is forced through spinnerets dotted with tiny holes, a bit like a shower head.
- It's then separated into threads for spinning, dyeing and weaving into cloth.

# PLANTS USED IN WEAVING: BAMBOO



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By Tharish - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=18213204>



By PaulCamera location 11° 58' 20.398" N, 120° 04' 01.802" E View this and other nearby images on: OpenStreetMap - originally posted to Flickr as IMG\_0395, CC BY-SA 2.0, <https://commons.wikimedia.org/w/index.php?curid=8115245>



By Bernard Gagnon - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=14996191>



# PLANTS USED IN WEAVING: BAMBOO

The two most widely used processes to manufacture fabric from bamboo are:

*Process 1:* In this bamboo fabric manufacturing process, the plants are crushed in a mash using natural enzymes and then combed and cut into yarns. The fabric produced in this way is similar to linen.

This method has some environmental flaws, but it can be sustainable. However, it is expensive, because it is labor-intensive. The fabrics produced are not enough flexible to be used in the increasingly popular bamboo fiber underwear.

*Process 2:* The plants are boiled in a cocktail of sodium hydroxide and carbon disulfide solvents in this method of bamboo fabric manufacturing process.

Both of these chemicals are harmful to health and can harm aquatic life. The pulp is made from boiled bamboo and then yarn is cut from it. Later, the cloth is woven from this yarn which becomes very soft.

# PLANTS USED IN WEAVING: BAMBOO

- Clothing made from bamboo fibers is much more comfortable than items made from synthetic fabrics. Bamboo fabrics are softer than cotton materials, as their texture is like silk or cashmere.
- Bamboo garments absorb moisture quickly, making them a great fabric for lightweight summer shirts and slacks.
- Bamboo fabrics are hypoallergenic and antibacterial. They keep clothes odor-free and, thus, feel and smell fresh.
- Research evidence suggests that bamboo fabric blocks detrimental ultraviolet rays from the sun. This means that using it will protect your body from harmful ultraviolet rays and protect it from skin cancer.
- Bamboo fabric is breathable and does not 'grip' against the skin. It also helps control body temperature and keep clothing and bedding cool.

# PLANTS USED IN WEAVING: BAMBOO



# PLANTS USED IN WEAVING: JUTE

- **Jute** comes from the plant fibers of the tropical zone called corchoros and resemble the fabrics of hemp.
- They are used for wrapping goods, carpets, etc.

# PLANTS USED IN WEAVING: JUTE



<https://textileapex.blogspot.com/2014/12/jute.html>



<https://www.fibre2fashion.com/industry-article/1239/jute-fiber-of-the-future>



**Jute Fibre**

<https://www.flexiprep.com/NCERT-Exercise-Solutions/Science/Class-6/Ch-3-Fibre-To-Fabric-Part-2.html>

# PLANTS USED IN WEAVING: JUTE



# PLANTS USED IN WEAVING

NATURAL FIBRES	PROPERTIES		USES
Cotton	<ul style="list-style-type: none"> <li>✓ Highly absorbent</li> <li>✓ Comfortable to wear</li> <li>✓ Strong and durable</li> <li>✓ Easy to care for</li> </ul>	<ul style="list-style-type: none"> <li>✓ Can shrink</li> <li>✓ Creases due to limited elasticity</li> </ul>	<ul style="list-style-type: none"> <li>• Clothing</li> <li>• Bed linen</li> <li>• Upholstery fabric</li> <li>• Used in medical industry (can be boiled)</li> </ul>
Linen	<ul style="list-style-type: none"> <li>✓ Highly absorbent</li> <li>✓ Cool to wear</li> <li>✓ Very strong and durable</li> </ul>	<ul style="list-style-type: none"> <li>✓ Creases easily due to poor elasticity</li> </ul>	<ul style="list-style-type: none"> <li>• Summer clothing</li> <li>• Tablecloth and napkins</li> <li>• Upholstery fabric</li> </ul>
Hemp	<ul style="list-style-type: none"> <li>✓ Absorbent</li> <li>✓ Strong</li> <li>✓ Naturally antibacterial</li> </ul>		<ul style="list-style-type: none"> <li>• Clothes</li> <li>• Carpets</li> <li>• Rugs</li> <li>• ropes</li> </ul>
Bamboo	<ul style="list-style-type: none"> <li>✓ Breathable</li> <li>✓ Comfortable</li> <li>✓ Very soft</li> </ul>	<ul style="list-style-type: none"> <li>✓ Plants need a lot of water</li> <li>✓ Not very durable</li> <li>✓ Creases easily</li> </ul>	<ul style="list-style-type: none"> <li>• Clothes</li> </ul>
Jute	<ul style="list-style-type: none"> <li>✓ Absorbent</li> <li>✓ Very strong</li> </ul>	<ul style="list-style-type: none"> <li>✓ Coarse</li> </ul>	<ul style="list-style-type: none"> <li>• Bags</li> <li>• Sacs</li> <li>• Carpets</li> <li>• Twine</li> </ul>

# ANIMAL FIBRES USED IN WEAVING: WOOL

- **Wool** is produced from the coat/hair of vegetarian animals, usually from the sheep. However, it can also be produced from the coat/hair of the goat, camel, etc.
- Wool absorbs moisture and is a bad conductor of heat.
- There are different types of sheep that provide different wool quality.
- The most common types of wool are Merino and Cheviot.
  - ✓ Merino wool is short, fine and crimped.
  - ✓ Cheviot wool is long, strong and plain.
- After shearing, the wool is separated. The most important part is the fleece. The fleeces will be classified, because the quality of the wool is different depending on the part of the body. For example, the best wool comes from the shoulder parts.



# ANIMAL FIBRES USED IN WEAVING: WOOL



Merino sheep

[https://images.search.yahoo.com/search/images;\\_ylt=AwE19FMCspgFw4An2hXNyoA;\\_ylu=Y29sbwNiZjEEcG9zAzEEdnRpZANDMTg2Ml8xBHNlYwNwaXZz?p=merino+sheep+images&fr2=piv-web&fr=mcafee\\_uninternational](https://images.search.yahoo.com/search/images;_ylt=AwE19FMCspgFw4An2hXNyoA;_ylu=Y29sbwNiZjEEcG9zAzEEdnRpZANDMTg2Ml8xBHNlYwNwaXZz?p=merino+sheep+images&fr2=piv-web&fr=mcafee_uninternational)

# ANIMAL FIBRES USED IN WEAVING: WOOL



By Cheviot\_ewe\_with\_lamb.jpg: Donald Macleod from Stornoway, Scotland derivative work: Coycan (talk) - Cheviot\_ewe\_with\_lamb.jpg, CC BY 2.0, <https://commons.wikimedia.org/w/index.php?curid=11216987>



By Jane Cooper Orkney - Own work, CC BY-SA 4.0, <https://commons.wikimedia.org/w/index.php?curid=45697960>

Cheviot sheep

By Stuart Meek, CC BY-SA 2.0, <https://commons.wikimedia.org/w/index.php?curid=12910785>

# ANIMAL FIBRES USED IN WEAVING: WOOL

- To produce a thread out of the pure wool, the wool fibres have to be combed or carded.
  - ✓ Combed yarn is a strong twisted flat yarn. It's used for light plain woollen cloth.
  - ✓ Carded wool yarn is an uncombed yarn made from strong crimped fibres. The yarn is soft and fluffy.
- Pure wool is often blended with chemical fibres to get a more hardwearing material.

# ANIMAL FIBRES USED IN WEAVING: WOOL



<http://en.wikipedia.org/wiki/File:Wool.www.usda.gov.jpg>

# ANIMAL FIBRES USED IN WEAVING: WOOL



Wool fibres

<https://www.bbc.co.uk/bitesize/guides/z74bcj6/revision/5>

# ANIMAL FIBRES USED IN WEAVING: WOOL

- Wool fibres are stretchable and crease-resistant.
- Due to its crimped fibres, wool can enclose air and keep it warm. Consequently, warm winter clothes are made from wool, like coats, suits, dresses, knitwear and socks.
- Other than sheep wool, you can also use:
  - ✓ Angora and Mohair wool from the angora goat
  - ✓ Cashmere from the cashmere goat
- These are wool fibres of a very high quality and price and are only used for high class fashion.

# ANIMAL FIBRES USED IN WEAVING: WOOL

Angora goat



# ANIMAL FIBRES USED IN WEAVING: WOOL

Cashmere goat



By Charles Esson at English Wikipedia, CC BY 3.0, <https://commons.wikimedia.org/w/index.php?curid=43829157>



# ANIMAL FIBRES USED IN WEAVING: WOOL

Processing Our Raw Sheep Wool Into Yarn ->

<https://www.youtube.com/watch?v=6wb07eV5w0s>

From Sheep to Cloth ->

<https://www.youtube.com/watch?v=ngLoJxssEao>

# ANIMAL FIBRES USED IN WEAVING: SILK

- **Silk** is a very expensive fibre, due to the complex production process\*.
- The fibre is obtained from the cocoon of the silkworm.
- The silkworm produces two fibres formed from two adenoids that build the silk yarn.
- Silk is a soft, fine, airy and shiny cloth.
- The fibre has a high breaking and abrasion resistance.
- Silk is usually chosen for eveningwear or expensive daywear and underwear.
- The most common silk cloth is crepe de chine, crepe georgette and crepe satin.
- Silk can also be blended with other fibres.

# ANIMAL FIBRES USED IN WEAVING: SILK

## \*Silk: its production process

- *Bombyx mori* is a caterpillar and the the most prevalent silkworm.
- It belongs to the Bombycidae family which together with Saturnidae they produce silk.
- *Bombyx mori* originates from North China and Iran. From testimonials of silk thread processing tools found, it seems that silk cultivation began around 3000 BC. In Europe it becomes known with the campaign of Alexander the Great in the Indies while its cultivation begins during the time of the Byzantine Empire.
- Silkworms' development is going through 4 forms: egg, larva, chrysalis, butterfly. From the egg comes the larva after 30 days of rearing with mulberry leaves.

# ANIMAL FIBRES USED IN WEAVING: SILK



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By Krish Dulal - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=12657661>

# ANIMAL FIBRES USED IN WEAVING: SILK

How silkworms make silk ->

<https://www.youtube.com/watch?v=77ktNSPFbwQ>

How silk is made: Silk processing making from silkworm - Silk farm harvesting ->

<https://www.youtube.com/watch?v=vCZQ56oVfDM>

# ANIMAL FIBRES USED IN WEAVING: SILK

Court ladies preparing newly woven silk



[https://commons.wikimedia.org/wiki/File:Court\\_Ladies\\_Preparing\\_Newly\\_Woven\\_Silk\\_\(%E6%8D%A3%E7%BB%83%E5%9B%BE\)\\_by\\_Emperor\\_Huizong\\_\(1082%E2%80%931135\).jpg](https://commons.wikimedia.org/wiki/File:Court_Ladies_Preparing_Newly_Woven_Silk_(%E6%8D%A3%E7%BB%83%E5%9B%BE)_by_Emperor_Huizong_(1082%E2%80%931135).jpg)

# ANIMAL FIBRES USED IN WEAVING: SILK

- The silkworm larva produces a single but several hundred-yard-strand of silk, which breaks as it emerges as a moth from its cocoon.
- Instead of gathering the tangled silk caught in the trees, the Chinese first learned to raise the silkworms on a fattening diet of the leaves of carefully cultivated mulberry trees.
- They also learned to watch the development of the cocoons so they could kill the chrysalis by plunging it in boiling water just before its time.
- This method ensures the full length of silk strands. The boiling water also softens the sticky protein holding together the silk.
- The process of pulling out the strand of silk from the water and cocoon is known as reeling.

# ANIMAL FIBRES USED IN WEAVING: SILK

- Soufli is a town in Evros, Thrace, located in the north-eastern part of Greece.
- From the early 1800s, Soufli was famous for the silk production. Silk manufacturing flourished in the 19<sup>th</sup> century in Soufli.
- In 1903, the brothers Azaria established there the first silk factory.
- During the Balkan Wars and the First World War, the demand and export in cocoon and silk textiles decreased and there was a crisis in the production of silk.
- The absence of areas available for the cultivation of mulberries further contributed to this crisis.
- Silk production remains the driving force for the local economy.
- The Museum Network of the Piraeus Bank Group Cultural Foundation set up the Silk Museum in Soufli, in 1990. The Silk Museum is housed in the Kourtidis Mansion (1883) and present to the visitors the pre-industrial techniques by which silkworms were bred (sericulture) and how silk was woven.



# ANIMAL FIBRES USED IN WEAVING: SILK



Museum of Silk in Soufli,  
Thrace, Greece

*Μουσείο Μετάξης. Εξωτερική άποψη. Φωτ.: Γρηγόρης Μπιστίνας.*

# ANIMAL FIBRES USED IN WEAVING: SILK



Museum of Silk in  
Soufli, Thrace,  
Greece

<https://www.travel-zone-greece.com/blog/silk-museum-soufli/>

# ANIMAL FIBRES USED IN WEAVING: SILK



Museum of Silk in Soufli:  
Traditional costumes  
made of silk

*Μουσείο Μετάξης. Η προθήκη με τις τοπικές φορεσιές. Φωτ.: Γρηγόρης Μπιστίνας.*

<https://www.piop.gr/el/diktuo-mouseiwn/Mouseio-Metaxis/Istoriko.aspx>

# ANIMAL FIBRES USED IN WEAVING

NATURAL FIBRES	PROPERTIES		USES
Wool	<ul style="list-style-type: none"> <li>✓ Absorbent</li> <li>✓ Good insulating properties</li> <li>✓ Strong</li> <li>✓ Good elasticity</li> </ul>	<ul style="list-style-type: none"> <li>✓ Can shrink on washing</li> </ul>	<ul style="list-style-type: none"> <li>• Clothes</li> <li>• Carpets</li> <li>• Blankets</li> </ul>
Silk	<ul style="list-style-type: none"> <li>✓ Absorbent</li> <li>✓ Good sheene</li> </ul>	<ul style="list-style-type: none"> <li>✓ Creases easily</li> <li>✓ Difficult to wash</li> </ul>	<ul style="list-style-type: none"> <li>• Luxury clothing, e.g.,               <ul style="list-style-type: none"> <li>○ Dresses</li> <li>○ Underwear</li> <li>○ Bedding</li> </ul> </li> </ul>

# MANUFACTURED (MAN-MADE) MATERIAL USED IN WEAVING

- Fibres are either natural or man-made (manufactured).
- *Man-made, manufactured* are synthetic fibres, are made mainly from non-renewable coal and oil refined into monomers, which join together in a process called polymerisation.
- They do not degrade easily, and they can be made into any length (continuous filament) and thickness.

# MANUFACTURED (MAN-MADE) MATERIAL USED IN WEAVING

MANUFACTURED FIBRES	PROPERTIES		USES
Acrylic	<ul style="list-style-type: none"> <li>✓ Good strength &amp; elasticity</li> <li>✓ Does not crease</li> </ul>	<ul style="list-style-type: none"> <li>✓ Poor absorbency</li> </ul>	<ul style="list-style-type: none"> <li>✓ Clothes</li> <li>✓ Fake fur jackets</li> </ul>
Polyester	<ul style="list-style-type: none"> <li>✓ Good strength &amp; elasticity</li> </ul>	<ul style="list-style-type: none"> <li>✓ Poor absorbency</li> </ul>	<ul style="list-style-type: none"> <li>✓ Clothes</li> <li>✓ Sportswear</li> </ul>
Nylon (Polyamide)	<ul style="list-style-type: none"> <li>✓ Good strength &amp; elasticity</li> <li>✓ Does not crease</li> <li>✓ Resistant to chemicals</li> </ul>	<ul style="list-style-type: none"> <li>✓ Poor absorbency</li> <li>✓ Melts easily</li> </ul>	<ul style="list-style-type: none"> <li>✓ Clothes</li> <li>✓ Sportswear</li> <li>✓ Carpets</li> <li>✓ Ropes</li> <li>✓ Tents</li> <li>✓ Parachutes</li> </ul>
Elastane	<ul style="list-style-type: none"> <li>✓ Highly elastic and stretchy</li> <li>✓ Strong</li> </ul>		<ul style="list-style-type: none"> <li>✓ Clothes (e.g., leotards)</li> <li>✓ Sportswear and swimming costumes</li> </ul>

# MANUFACTURED (MAN-MADE) MATERIAL USED IN WEAVING

Nylon rope



<https://www.bbc.co.uk/bitesize/guides/z74bcj6/revision/5>

# REGENERATED MATERIAL USED IN WEAVING

- Regenerated fibres are made from natural cellulose which has been chemically modified.
- Most common regenerated fibres are:
  - ✓ Viscose
  - ✓ Modal
  - ✓ Tencel



# BLENDED MATERIALS USED IN WEAVING

- Blended fibres are mixtures of fibres that combine properties of two or more fibres.
- Some common fibre blends include:
  - ✓ Wool & Nylon
  - ✓ Viscose & Nylon
  - ✓ Polyester, Wool & Lycra
  - ✓ Linen & Polyester
- The main reasons for blending fibres are:
  - ✓ To reduce the cost of the fabric
  - ✓ To make the fabric stronger
  - ✓ To make the fabric easier to care for
  - ✓ To create fabrics that are crease resistant

# BLENDED MATERIALS USED IN WEAVING

BLENDED FIBRES	PROPERTIES	USES
Polycotton (60% cotton & 40% polyester)	<p>The blended fibres improve the properties of both cotton and polyester. For example,</p> <ul style="list-style-type: none"><li>✓ Cotton has poor elasticity and creases BUT polyester has good elasticity and does not crease</li><li>✓ Cotton is absorbent and comfortable to wear BUT polyester is not absorbent and does not allow the skin to “breathe”</li></ul>	<ul style="list-style-type: none"><li>• Easy care clothes (e.g., shirts)</li><li>• Bed linen</li><li>• Duvet covers</li></ul>

# MATERIALS USED IN WEAVING

Concluding...

Natural Plant/Vegetable (Cellulosic)	Natural Animal (Protein)	Man-made	Regenerated
Cotton	Wool	Polyester	Viscose
Linen	Silk	Acrylic	Modal
Hemp		Elastomeric fibres (e.g., lycra, spandex)	Tencel
Bamboo		Polyamides (e.g., nylon)	
Juta			

# CARE AND MAINTENANCE OF TEXTILES

- We need to take care of our textile products to keep them in good condition.
- A **care label** describing how to take care of the textile product is usually attached on it.
- The **care label** must present the following information:
  - ✓ The fibres used to produce the textile

100% cotton

60% cotton/40%polyester

- ✓ It may have warnings for the consumer (e.g., “Keep away from fire”)
- ✓ Information and instructions on how to take care of the product, presented by a series of symbols, which are the same in all European countries and many other parts of the world.

# CARE AND MAINTENANCE OF TEXTILES

- The symbols on the *care label*, representing the main processes of the care and maintenance of the textiles, could be the following:



■ Wash tub: the product can be washed



■ Circle in a square: information about the drying of the product



■ Iron: information about the ironing of the product



■ Triangle: information about the bleaching of the product







■ Circle: information about the dry-cleaning of the product

# CARE AND MAINTENANCE OF TEXTILES

There are further information for each of the above mentioned symbols. Thus, for the wash tab...



- If there is a number below the waterline in the wash tub symbol, it indicates the maximum temperature of the water (in °C).
  - ✓ Maximum wash temperature 40 °C, appropriate for polyester and nylon 
- Bars below the wash tub give information about the agitation of the washing machine (e.g., the speed of the spinning process)
  - ✓ One bar: machine action medium or reduced 
- A wash tab with a hand indicates that the product must be hand-washed 
- A wash tub with a cross through it indicate that the product should not be washed 

# CARE AND MAINTENANCE OF TEXTILES

The symbol for drying refers to *tumble-drying*. Two options can be given:

The product can be tumble-dried



*or*

The product cannot be tumble-dried.



Textiles that might shrink when tumble-dried are silk and wool

# CARE AND MAINTENANCE OF TEXTILES

The iron symbol  indicates *how hot* the iron could be:

Cool iron: recommended for textiles from nylon, acrylic, and polyester



Warm iron: recommended for textiles from wool and polyester blends



Hot iron: recommended for textiles from cotton and linen




Do not iron





# CARE AND MAINTENANCE OF TEXTILES

The triangle symbol  indicates whether or not *chlorine bleach* can be used to remove stains from the textile. The colour, the finishing, or certain types of textile (e.g., wool and silk) may be damaged when chlorine bleach is used. Thus, there are two options:

The textile can be washed with chlorine bleach




*or*

The textile cannot be washed with chlorine bleach



# CARE AND MAINTENANCE OF TEXTILES

The circle  indicates whether or not the textile can be *dry-cleaned*, a process that uses chemicals, heat and friction instead of water to clean the product. Viscose and silk textiles, as well as some woollen garments are usually dry-cleaned. The following symbols are often used:

The textile can be dry-cleaned. The letters indicate which chemicals should be used

A

P

F

or

The textile cannot be dry-cleaned



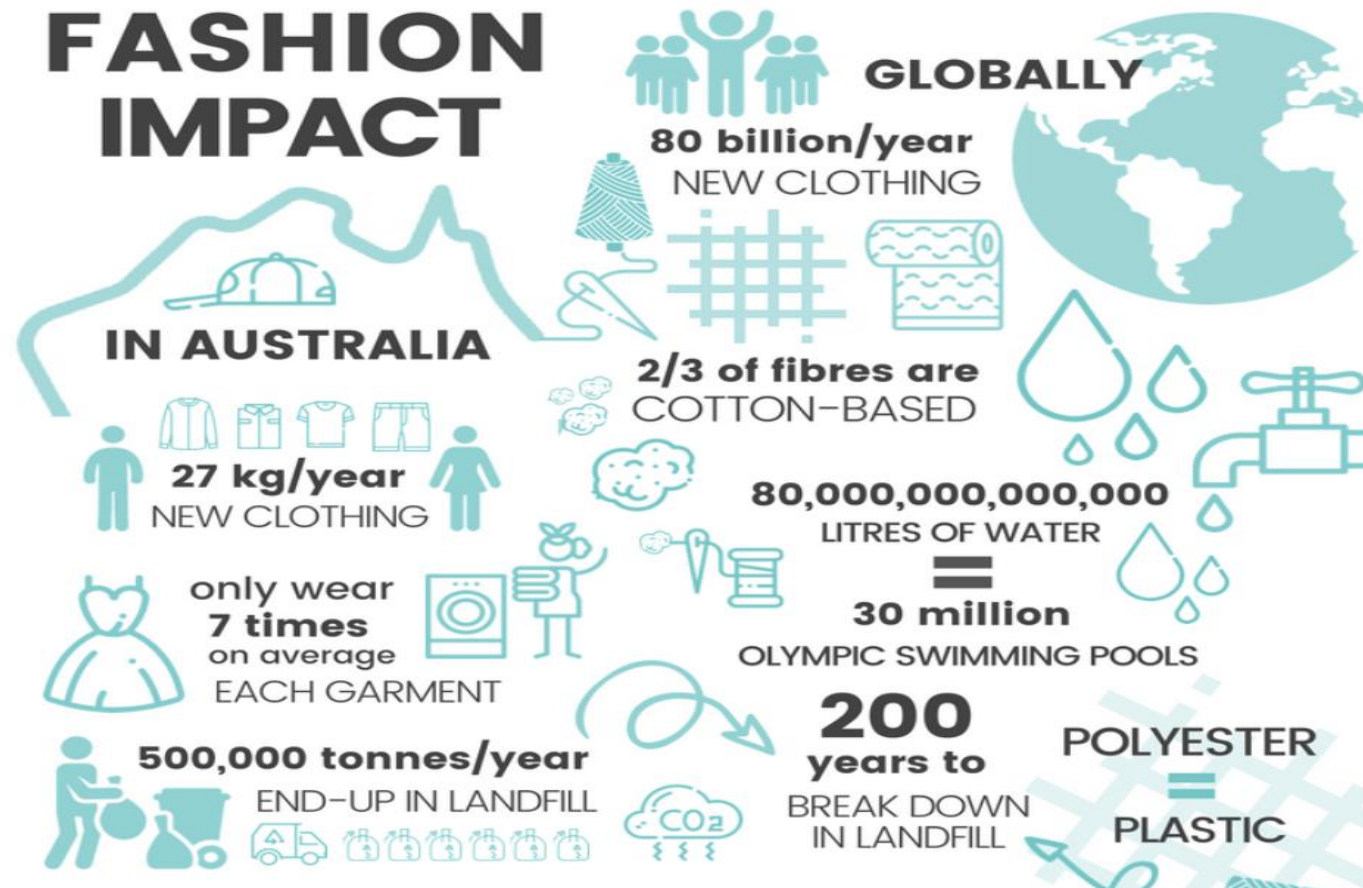
# TEXTILES AND THE ENVIRONMENT

The manufacture, use, and disposal of fabrics can have serious consequences for the environment, such as:

1. Growing cotton uses fertilisers and pesticides which can pollute the atmosphere and the water.
2. Synthetic fibres are made from petrochemical that come from non-renewable sources.
3. There are changes to the landscape due to the intensive deforestation or farming, when for example we grow cotton crops or expand the areas where herds are kept.
4. Manufacturing and finishing processes use chemicals (e.g., dyeing, etc.), water and energy.
5. Caring for the fabrics requires the use of detergents, dry-cleaning fluids, energy and water.
6. Discarded fabrics can take many years to decompose.

# TEXTILES AND THE ENVIRONMENT

Some shocking data of the fast fashion impact



# HOW TO MAKE OUR TEXTILES “GREENER”

- ✓ Assessing a fabric’s “life-cycle” and consider its impact on the environment.
- ✓ Recycle fabrics and produce new fabrics from recycled materials.
- ✓ Using natural, eco-friendly, organic dyes made from plants, fruits, barks, stems, herbs, algae, fungi, etc.
- ✓ Using detergents effective at lower temperature (around 30°C).
- ✓ Using energy-efficient washing machines and dry the fabrics outside, whenever is possible.
- ✓ Avoid discarding perfectly serviceable fabrics and clothes because they are not in fashion.

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# Time for questions...



<http://clipart-library.com/clipart/kcMKrBg5i.htm>



<https://www.dreamstime.com/stock-illustration-stickman-question-bulb-answer-white-background-image51960894>

# QUESTIONS

1. Can you name the following pictures?

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<https://www.gtreview.com/news/africa/renewed-funds-for-benins-cotton-season/>



<http://en.wikipedia.org/wiki/File:Wool.www.usda.gov.jpg>

2. Do you remember their origin?



# QUESTIONS

3a. What fibres can we use to make this shirt?

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[https://www.marni.com/hr/long-sleeve-jumper\\_cod14146172oo.html#dept=kntwrds](https://www.marni.com/hr/long-sleeve-jumper_cod14146172oo.html#dept=kntwrds)

# QUESTIONS

3b. What fibres can we use to make this bed linen?

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<https://www.gettyimages.com/photos/bedding>

# QUESTIONS

4. Do you remember some of the properties of the following fibres?

FIBRES	PROPERTIES
Cotton	
Linen	
Wool	
Silk	

# QUESTIONS

5. Do you remember some of the following symbols?

