Fibres & industry

Lesson Objective:

To understand where fibres come from and their uses and properties.

To combine our knowledge of fibres with industrial practices

What are fibres?

A fibre is thin hair- like structure that can be either long or short.

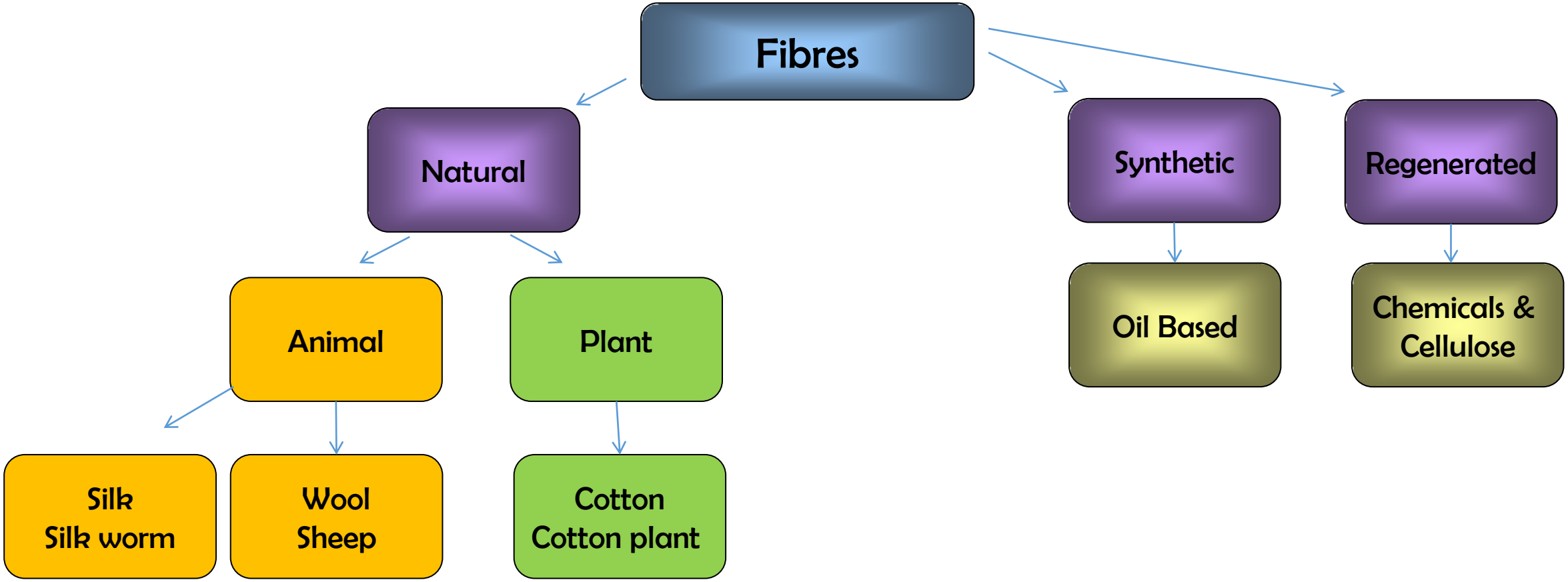
Short fibres are called **staples** fibres.

Long fibres are called **filament** fibres.

Staple fibres need to be spun into yarns and tend to be slightly hairy in appearance.

Filament fibres are long and give a smooth shiny finish to fabrics.

All fabrics come from fibres. On their own they are weak but when twisted into yarns they take on different properties.



Technical language:

Stock form = the form in which the material is bought in.

i.e. wool = wool yarn

Cotton = cotton roll (fabric roll).

Cotton

Advantages	Disadvantages

Plant fibres

Fibre name: Cotton

– almost half of textile products are made from cotton!

Source: fine hairs on the seeds of a cotton plant.

Properties:

- Strong - So items can be washed often, fibres are stronger when wet
- Fresh and cool to wear (breathable)
- Very absorbent, fast drying
- smooth
- Good drape
- Versatile
- Durable
- Creases badly
- Easy to care for – (wash and iron)
- Can be blended and mixed with other fibres
- Can be coloured easily
- Damaged by sunlight and mildew
- Can be treated with **finishes** to improve properties
- Flammable

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Wool

Advantages	Disadvantages

Animal fibres

Fibre name: wool (staple fibres)

Source: hair of sheep – known as coat or fleece

Properties:

Warm

Absorbent

Low flammability

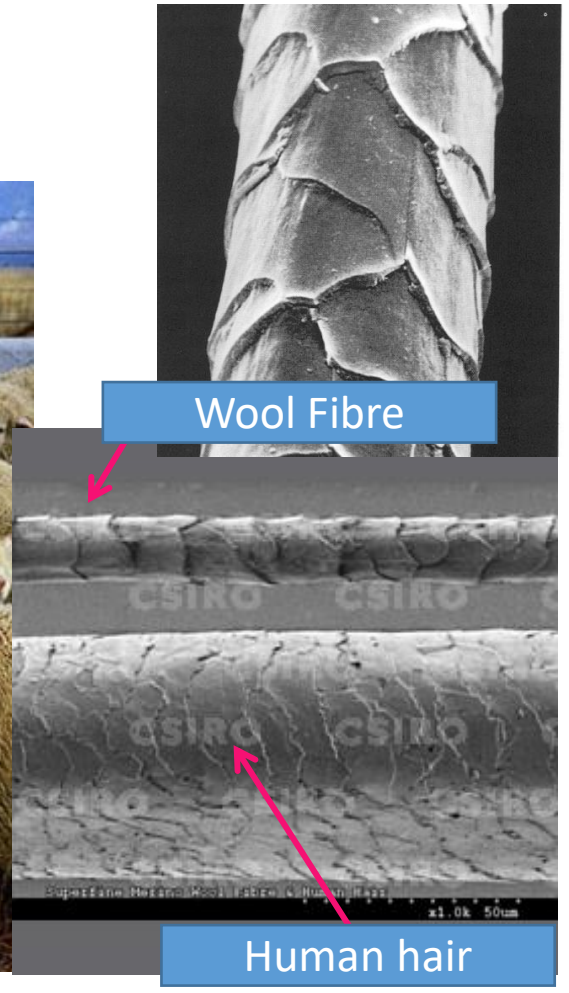
Good handle

Elasticity

Doe not crease easily

May shrink in wash

Takes a long time to dry



Wool fibres have tiny overlapping scales which allow the wool fibres to repel rain and spilled liquid with ease. The natural crimp helps the fibres to retain their shape and wool fibres can be stretched and then readily bounce back into shape.

Silk

Advantages	Disadvantages

Animal fibres

Fibre name: Silk (filament fibre)

Source: cocoon of the silkworm

Properties:

Absorbent

Soft

Comfortable

Cool and warm

Natural sheen

Handles well

Strong when dry

Drapes well

Expensive

May crease easily.

Weaker when wet

Strong – one of the strongest fibres but loses up to 20% of strength when wet.

Can be spoiled by chemicals and perspiration

Does not burn easily

Other natural fibres

Cashmere Goats

Cashmere is fine in texture, and strong, light, and soft. It is also very warm and insulating.

Camel hair is the hair from camels and can be used to make coats and jackets as well as brushes.

Angora rabbit

Angora is known for its softness and fluffiness. It is also known for its silky texture. It is much warmer and lighter than sheep wool.

Bamboo

Bamboo is soft, strong, easy to dye colours. It has natural antibacterial elements in bamboo fibre keep bacteria away from bamboo fabrics.

Stinging Nettles

Nettle fibres are white, silky and long. They produce a finer and silkier fabric than linen.

Summary

- Natural fibres are very versatile and widely used in textile product.
- There are two types of fibres filament and staple.
- The two sources of natural fibres are plants and animals.
- All plant fibres are flammable, breathable and absorbent.
- Natural fibres come from sustainable sources.

https://Cotton harvesting

Start from 5mins in

Primary source to stock form

Put the statements in order starting with the primary source and ending in in the stock form.

The fibres (Sliver) are **spun** into thread		
The thread is **woven** or **knitted** into cloth		
Ginning - To separate the fibres from the seeds and waste.		
Cotton is grown mostly India, America and China. The cotton **Boll** is harvested		
After ginning, the cotton is carded – all fibres are placed in the same direction. This is a **sliver – a soft untwisted rope.**		
Cotton boll is packed into bales		
Cotton lint is packed into **bales**.		

The fibres (Sliver) are **spun** into thread		6
The thread is **woven** or **knitted** into cloth		7
Ginning - To separate the fibres from the seeds and waste. Fibres are washed and dryed		3
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Cotton **ball** is packed into **bales**		2
Cotton **lint** is packed into **bales**.		4

Video

60 seconds - cotton boll to cotton fabric

Can you match your statements to the video?

What makes cotton suitable for mass production?

1.

2.

3.

- Cotton is a natural material that is readily available in large quantities.
- Products can be nested together on large sheets of cotton to minimise waste.
- Automated machines can cut patterns in material to ensure repeatability and consistency.
- Several layers of cotton can be cut at the same time.
- Can be dyed or printed on to easily
- Easy to for the consumer to look after – washing and drying.

How can fabrics be strengthened?

Laminating – adding a protective layer on top of the fabric.

Think waterproof jackets, iron-on vinyl.

Layering – Layering fabrics can reinforce the strength. Especially fabrics such as interfacing and collar stands. Fusing (bondaweb) can be used to join fabrics together.

Adding structure - boning is used in corsets to add structure to reinforce the fabric to hold the correct shape. Skirt hoops are another example.

Construction methods - In a product, you could use a stronger **seam** i.e. flat fell, to give more strength when the fabric is stretched.

Production methods – what are the definitions?

Mass

Batch

One-off

Just in time

HL – Fibres

(Grade 3+)
Revisit your learning: Create a revision poster on the properties of cotton, silk and wool.

(Grade 5+)
Reinforce your learning:
1. Create a poster/leaflet on the production of cotton from harvesting to a roll of fabric
2. Research one industrial technique that could be used in the manufacturing of a cotton product and explain the process.

Industrial process could be to construct or add decoration to a product.

(Grade 7+)
Extend your learning:
1. Research one industrial technique that could be used in the manufacturing of a cotton product and explain the process.

Industrial process could be to construct or add decoration to a product.
2. Give **two** reasons why the characteristics of the material are suitable for it's intended use:
Polypropylene – for a school stacking chair
Brass – for a trumpet
Pine – for a bedroom wardrobe
Silk – for a men's tie