2 MATERIALS IN FASHION

TEACHER'S NOTES

GRADE: 7–9

SUBJECTS: MATERIAL TECHNOLOGY
NATURAL SCIENCE
CHEMISTRY
SUSTAINABILITY

TEACHING OBJECTIVES

- Understand the difference between natural fibres and non-natural fibres.
- Identify some of the processes by which different fibres are extracted and made.
- Assess the sustainability of some of the most common fibres.

OVERVIEW OF THE MODULE:

Time guidelines are estimated.
Please feel free to organise the class as you consider more convenient.
Happy teaching!

VIDEO INTRODUCTION TO THE FUTURE OF TEXTILES. 5 MIN

This video will get students excited about the future of fabrics. It will also show them how technology can be intertwined with the traditional way of producing fabrics to innovate on the new materials on the future.

2.1 INTRODUCTION TO FIBRES — 1x45 MIN

This unit will explain the basics of fibres and how they are organised according to their provenance.

- Sustainability
- Material Science

2.2 NATURAL AND MANMADE FIBRES — 2x45 MIN

This unit will explain in depth fibres like cotton, wool, polyester and viscose. How they are produced and what is their sustainable footprint.

- Sustainability
- Material Science

2.3 CHEMISTRY ACTIVITY — 2x45 MIN

This unit will dive more specifically into the chemistry behind natural dyes and how they work on fabrics.

- Sustainability
- Chemistry

SECTIONS IN THIS MODULE:

ACTIVITY – MAPPING YOUR CLOTHES

10 MIN

DIFFICULTY ● ● ○ ○ ○

MATERIALS NEEDED 5 different colour sticky notes or markers

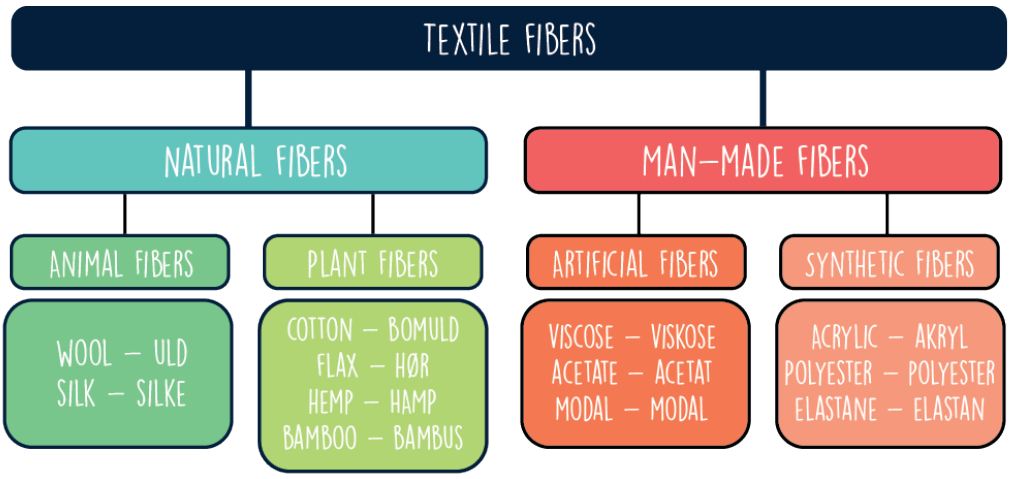
The purpose of this workshop is to make students aware of what materials are out there and to know what kind of material they are wearing.

1

The class should be equipped with five different colour sticky notes. Each colour is a different category.

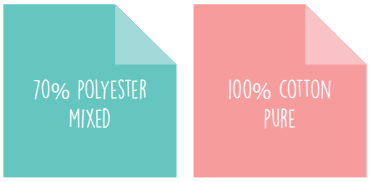
- Artificial (viscose, Modal, Cupro, Lyocell, Acetate, Soya ...)
- Synthetic (polyester, Polyamide ...)
- Natural Fibres - From plants (Cotton)
- Other natural fibres from plants (Hør, Ramie, Bamboo...)
- Animal fibres (wool, Angora, Mohair, Kashmir, Silk ...)

Here there is a guide to all the materials devided in sections. Just in case some students bring rare fibres:



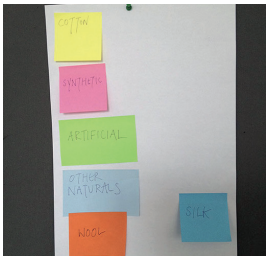
2

All students are asked to check what their clothes are made of and to write it on the sticky notes that suits the material the most.
Note that a lot of the clothes we wear are made of mixed materials. Therefore choose the material that has the highest percentage and remind the students to write “mixed” on the note. One note for each piece of clothing.



3

Make a post-it wall to illustrate, what type of material is more popular.
Categorise it so it is easy to see the difference between the categories.
See picture.



4

(Optional) - Calculate Percentage of each material.

+5 MIN

- What percentage of the clothing pieces is made of cotton?
- What percentage of the clothing pieces is made of synthetic fibres?
- What percentage of the clothing pieces is made of mixed materials?
- What percentage of the clothing pieces is made of pure material?

5

(Optional) End the workshop with a class discussion on how the class dresses.
Under questions could be:

+5 MIN

- What are good and bad materials?
- Why do you choose to wear this?
- How do you think the materials are made?
- What do you think is the most sustainable material?
- What material would you make your clothes of if you designed it?

VIDEO

5 MIN

Here is Nelson again. This time, Nelson will explain a few basic things about natural fibers and man-made fibers, leaving your class curious about all the amazing stuff that is behind fibres.

VOCABULARY

The vocabulary in this lesson is specially challenging. This section will help students to navigate the technical terms.

THEORY – A. FABRICS ARE EVERYWHERE...

5 MIN

In this module your students will learn the technical aspects of what is a textile and how a textiles get made. Also, they will read about the difference between natural fibres and man-made fibres.

ACTIVITY – "THE BURN TEST"

10 MIN

DIFFICULTY ● ● ● ○ ○

MATERIALS NEEDED 10 lighters or 10 candles.
10 swatches of different fabrics like: polyester, cotton, wool and rayon.

THE VIDEO IN THE PLATFORM WILL GUIDE STUDENTS ON HOW TO CONDUCT THE TEST IN 2 DIFFERENT FABRICS: POLYESTER (MAN-MADE FIBRE) AND SILK (NATURAL FIBER)

At the end of the teaching notes you can find a guide to The Burning Test with all the different fibers.

DISCUSSION

5 MIN

To summarise what they have been learning in this module, ask your students a few questions:

1. What aspects of natural fibres are sustaibable? And unsustainable?
2. What aspects of man-made fibres are sustainable? And unsustainable?

2x45 MIN

SECTIONS IN THIS MODULE:

A. NATURAL FIBRES

THEORY – PLANT FIBRES – COTTON — 10 MIN

This section will provide your students with information about cotton. How it is made, processed and what its sustainable footprint is.

ACTIVITY

To get your students to grasp the meaning of each paragraph, you can ask them to match the four titles in the beginning of the section to its correspondent paragraph.

RESEARCH TASK — 10 MIN

Divide your class in groups or pairs and assign one of these tasks to each group. After 5 min ask each group to present their findings. please feel free to use more time for this activity if needed.

TASK 1 - Find out about the use of genetic modification in the use of cotton.
TASK 2 - Find out about the effects of cotton on the Aral Sea.
TASK 3 - Gather some statistics on the use of chemicals in the cotton industry.
TASK 4 - Find out about any improvements in the sustainability of cotton.

THEORY – ANIMAL FIBRES – WOOL — 10 MIN

This section will provide your students with information about wool. How it is made, processed and what its sustainable footprint is.

DEBATE — 15 MIN

Divide your class in couples or teams and assign each team a side on the debate:

TEAM 1 - Defend wool as a sustainable fibre.
TEAM 2 - Defend wool as an unsustainable fibre.

Give them 10 min to research and gather information and 5 minutes to debate.

Find here some inspiring material to guide the debate
http://www.costfp1205.com/en/events/Documents/Bangor%20WS/Dibdiakova.pdf

B. MAN-MADE FIBRES

PRE-READING QUESTIONS

5 MIN

Here are some questions you could ask your students. Ask them out loud if you want to start a discussion, or ask them to write their answers on paper and ask a few of them to read their answers out loud afterwards.

1. **What is the difference between natural fibers and man-made fibres?**
2. **What is the difference between synthetic fibres and artificial fibres?**

THEORY – SYNTHETIC FIBRES – POLYESTER

10 MIN

In this section you will provide your students with information about polyester. How it is made, processed and what its sustainable footprint is.

THEORY – ARTIFICIAL FIBRES – VISCOSE

10 MIN

In this section you will provide your students with information about nylon. How it is made, processed and what its sustainable footprint is.

DEBATE

20 MIN

Divide your class in couples or teams and assign each team a side on the debate:

TEAM 1 - Defend polyester as a sustainable fibre.
TEAM 2 - Defend polyester as an unsustainable fibre.

TEAM 3 - Defend Nylon as a sustainable fibre.
TEAM 4 - Defend Nylon as an unsustainable fibre.

Give them 10 min to research and gather information and 5 minutes to debate for each fiber.

To be able to guide the debate find a little bit more of information about each fibre here:

Polyester: http://www.madehow.com/Volume-2/Polyester.html
Polyester life cycle assesment: http://www.designlife-cycle.com/polyester/

Viscose: http://www.madehow.com/Volume-1/Rayon.html
Viscose life cycle assesment: http://www.costfp1205.com/en/events/Documents/Bangor%20WS/Dib-diakova.pdf

SECTIONS IN THIS MODULE:

ACTIVITY – EXPERIMENTING WITH FABRIC DYING

DIFFICULTY ● ● ● ○ ○

MATERIALS NEEDED 5 different colours of sticky notes or markers

- Different sizes of beakers - mostly big ones
- Fabric swatches – cotton, silk or other natural fibres (natural dye doesn't colour synthetic fibres easily)
- Natural products: turmeric (dried or fresh), red cabbage
- Base: baking powder
- Acid: Lemon/lime
- Mordant: Vinegar
- PH neutral soap
- Paper, clamps, string

This activity will provide a practical framework for your students to understand some basic chemical reactions that happen when dying clothes with natural dyes.

Use the document on the platform "Chemistry guide for natural dying" to read about the different chemical processes behing this experiment.

The burn test

Burning a swatch is a simple way to test any fabric's fiber content. Here's how to burn and read the ashes for 10 common fiber types. You can usually immediately detect the presence of a synthetic in the ash of a fabric that appears to be all natural. Synthetic fibers, except rayon and Tencel (which are derived from cellulose), react differently from natural fibers: They melt, most turning into a hard bead. Natural fibers all leave a soft or crushable residue.

Adapted from Threads no. 81, "Fabric Lovers Always Carry a Flame," by Mary Elliott and Elaine Zarse.

Fiber	Approaching flame	In flame	Removed from flame	Odor	Ash
Cotton	Scorches; ignites quickly	Burns quickly; yellow flame	Continues to burn rapidly; has after glow	Burning paper	Light and feathery gray ash; ash is black if mercerized
Linen	Scorches; ignites quickly	Burns less quickly than cotton; yellow flame	Continues to burn	Burning paper	Light and feathery gray ash
Rayon, Tencel	Scorches; ignites quickly	Burns more quickly than cotton; bright yellow flame	Continues to burn rapidly; has no afterglow	Burning paper	Light and feathery gray ash
Silk	Smolders and curls away from flame	Burns slowly; sputters	Burns with difficulty; ceases to flame	Burning hair	Round, shiny black bead; easy to crush
Wool	Smolders and curls away from flame; ignites slowly	Burns slowly with small flickering flame; sizzles and curls	Ceases to flame	Burning hair; stronger odor than silk	Crisp, dark ash; round, irregular bead; easy to crush
Nylon	Fuses (melts without burning) and shrinks away from flame	Melts, then burns slowly	Flame ceases and dies out	Celery	Round, hard, grayish bead; won't crush
Polyester, poly fleece	Fuses and shrinks away from flame	Melts and burns slowly	Burns with difficulty	Chemical	Round, hard, black bead; won't crush
Acetate	Fuses away from flame; turns black	Blazes and burns quickly; sputters, melts, and drips like burning tar	Continues to melt and burn	Vinegar	Hard, black ash; irregular bead; difficult to crush
Acrylic	Fuses and shrinks away from flame	Flames rapidly; sputters and melts	Continues to melt and burn	Chemical	Irregular, hard, black bead; won't crush
Spandex	Fuses and shrinks away from flame	Melts and burns	Continues to melt and burn	Sharp, bitter	Soft, sticky, gummy

A small tin can hold a complete burn test travel kit: small scissors, tweezers, and butane lighter.