

Which fabrics shed most microfibres?

AGE RANGE: 7-11 years

OVERVIEW

Pupils explore why specific fabrics are used in their clothing and question how sustainable these choices are, introducing the idea of responsible consumption and production. By identifying the main fabrics used to make their uniforms, pupils investigate microfibre shedding which has a direct impact on life below water. They draw conclusions, giving reasons using their evidence from comparative tests combined with information gathered from secondary sources. Pupils understand what influences the decisions fashion companies make on which fabric to use, considering the impact on our world.

LEARNING OBJECTIVES

- Give reasons based on evidence from comparative tests for the particular uses of everyday materials
- Recognise that environments can change and that this can pose dangers to living things

WORKING SCIENTIFICALLY



- Use results to draw conclusions from evidence that is not straight forward, to suggest improvements and raise further questions.
- Report and present findings, including conclusions, causal relationships and explanations and degree of trust in results, in oral and written forms.
- Identify scientific evidence that has been used to support or refute ideas or arguments.

RESOURCES (groups of 3-4)

- A range of school uniform with readable labels (at least two items per child) – shirts/jumpers/fleeces/trousers/skirts/PE kit/lost property/spares etc.
- Sticky tape
- Magnifying glasses (as many as possible)
- **Fabric Fact Cards**
- **Gather Your Evidence Table**
- **Sample Results Table**

TO SUPPORT TEACHING

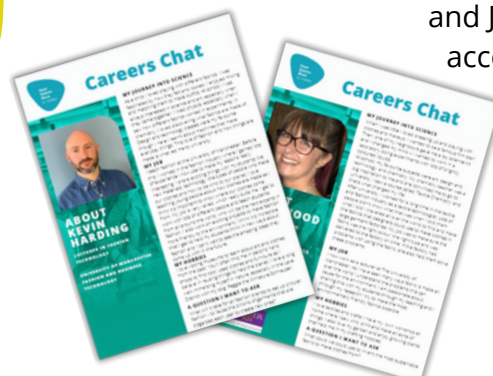
- [7-11 Great Fashion Share Video](#)
- [7-11 Great Science Conclusion Creator](#)

KEY WORDS

- fabric
- properties
- microfibre
- shedding
- observe
- describe

Inspire your pupils by exploring careers in STEM using our [Careers Chat](#) resources.

Download profile cards for Kevin and Jane and watch the accompanying videos.



[Kevin's video](#)

[Jane's video](#)

Step-by-step guide

Play the [7-11 Great Fashion Share Video](#) with Jane and Kevin to set the scene.



1. Place the clothing in a pile at the front of the class and ask the pupils to suggest how they could sort the clothing in different ways, e.g. colour, type of clothing, use. If not identified independently, ask them how they could use clothes labels to sort differently?



2. Each pupil will then collect an item of clothing and explore the label (modelled by teacher). They will sort and classify using the question, **'What types of fabric are used to make our uniform?'** Using the [Gather Your Evidence Table](#), each pupil will add their data as tally marks in the appropriate column.



3. Give pupils the [Fabric Fact Cards](#) and direct them to look at the advantages for each fabric. Encourage them to make statements that link why they think specific fabrics have been chosen to make their clothing.

For example: **'I think that polyester is used to make school jumpers because it is hard-wearing so it doesn't get holes in easily when we play in the playground.'**



4. Explain how each piece of clothing has the potential of shedding tiny bits of fabric called **microfibres** when they are washed or rubbed. Microfibres can be damaging to the environment, especially life below water. Encourage pupils to predict which items of their uniform they think will shed the most.

*(If you want to explore more about how clothes can be damaging to the world we live in, there is lots of information in the downloadable PowerPoint in the [Fashion Fixers](#) resources under **Extend Your Learning**.)*



5. Pupils work in groups of 3 or 4 and select 5 items of clothing to investigate. For each piece, they should record the type of clothing and the fabrics it is made from.

One approach to gathering evidence about shedding can be to use sticky tape. By pressing down sections of sticky tape onto clothing and pulling it off it is possible to see how much shedding takes place.

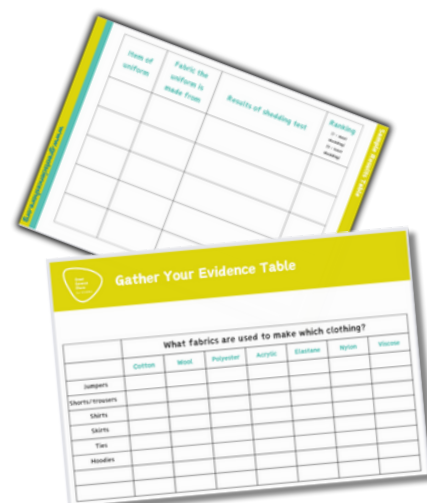


Ask pupils to consider other options, or to proceed to using this approach. This can be stuck into the [Sample Results Table](#).

6. Encourage pupils to look closely at their samples. Practise using a magnifying glass by putting it close to the eye and moving towards the sticky tape. Use microscopes (digital or standard) to look even closer at the microfibres.



7. Ask pupils to analyse by ranking their samples from 1 (least microfibres shed) to 5 (most microfibres shed).





8. Use the [7-11 Great Science Conclusion Creator](#) to develop a class conclusion. This will relate to which item of clothing sheds the most microfibres.

Now, ask the pupils to look at the disadvantages on the [Fabric Fact Cards](#). As a class discuss if their conclusions have changed. Do they still think the same item of clothing is the most harmful to the environment? Encourage pupils to use the evidence collected to support their reasoning.



9. Pupils can share their questions, enquiry processes and findings in an assembly as part of your schools' Great Science Share for Schools event.

Use the Talk Prompts in the fashion-linked [Great Question Ponder](#) as part of science and oracy development.



What is better - long lasting, expensive clothes or affordable clothes with a shorter lifespan?

EXTEND THE LEARNING!



Has the Great Fashion Share ignited an interest in your pupils? Follow up activities are available through **Energising Futures' Fashion Fixers** challenge.

The free resources enable pupils to explore the impacts the fashion industry has on our world and showcases science and technological innovations for a more sustainable fashion future.

[Take me to the resources](#)



Cotton



Advantages

- Is a natural fibre that comes from a cotton-plant
- Is naturally anti-bacterial
- When woven 'breathes' well (keeps people cool so it allows you to wear more and wash it less!)
- Is moisture-wicking (absorbs moisture)
- Is soft and comfortable on the skin
- Is easy to dye different colours
- Organic cotton is biodegradable and renewable

Disadvantages

- Non-organic cotton is not sustainable because it needs lots of water to grow
- Is very slow-drying
- Shrinks in hot water
- Stretches over time and loses its shape
- Coloured dyes fade when washed
- Wrinkles very easily
- Can attract mould and mildew when wet



Fascinating Fact

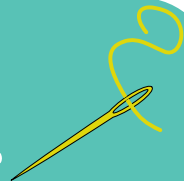
It takes 10,000-20,000 litres of water to produce just 1kg of cotton.

When mixed with polyester, it doesn't shrink or crease.

Fold



Polyester



Advantages

- Is extremely durable and long-lasting
- Is wrinkle and abrasion-resistant
- Is easy to clean
- Is cheap to make
- Dries quickly
- Can be dyed easily and retains colour when washed
- Is a very versatile fibre

Fascinating Fact

Polyester fibres are three times finer than silk and can be woven very tightly into fabrics that are windproof and waterproof!



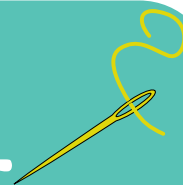
Disadvantages

- A man-made fibre called polyethylene terephthalate (PET) is the most widely used plastic in the world
- Is not as breathable as natural fibres
- Can feel rough or sweaty in hot conditions
- Requires the most energy to make out of all textile fibres
- Produces up to 9.5kg of CO2 emissions per tonne of fibre
- Needs an extreme amount of water to keep all the machines cool when it's being made
- Is not a sustainable fabric
- Is not biodegradable

Fold



Nylon



Advantages

- Is very strong
- Is durable - resistant to wear and tear
- Is versatile
- Can be used to make silky fabrics
- Is lightweight
- Is water-resistant
- Is easy-to-clean
- Can be dyed different colours
- Quick-drying



Fascinating Fact

Nylon was first used to make the bristles in toothbrushes!

Fascinating Fact

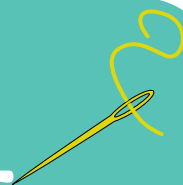
Nylon was first produced in 1935 by Wallace Carothers, who worked for DuPont in Delaware, USA.

Disadvantages

- Is a man-made fibre
- Is expensive to make
- Is highly flammable
- Nylon production is energy-intensive
- Can pill (become bobbly/fuzzy)
- Feels clammy in humid conditions
- Contributes to the accumulation of plastic waste in the natural environment
- Is not biodegradable

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Elastane



Advantages

- Is neither a natural fibre or man-made! It comes from wood pulp but is heavily processed to become a fabric
- Is durable and strong
- Is highly elastic and retains its shape
- Enhances the fit of clothing



Disadvantages

- Can become too stretched out over time
- Oils, sweat and washing detergents can break it down
- A variety of toxic chemicals are used in the production of elastane - if these aren't disposed of properly, they could damage the environment
- Is not biodegradable

Fascinating Fact

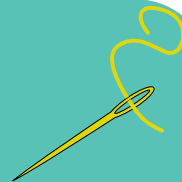
Elastane was invented in the 1950s by the DuPont company in Delaware, USA.



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Acrylic



Advantages

- A man-made fibre originating from oil
- Is lightweight
- Is warm and so often used as a wool substitute
- Is easy to wash
- Is cheap
- Is resistant to moths and chemicals

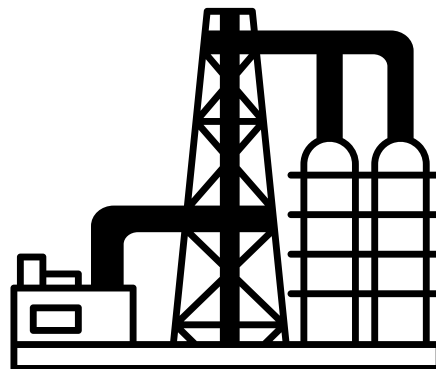
Fascinating Facts

Acrylic fabric is used in hair extensions and wigs!

Acrylic fabrics are highly flammable and once alight are difficult to put out.

Disadvantages

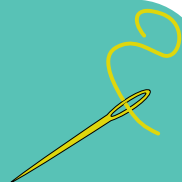
- Is weaker than wool
- Pills (becomes bobbly) over time
- Is not as breathable as natural fibres
- Is not biodegradable



Fold



Wool



Advantages

- Is a natural fibre which comes from sheep fleeces
- Wool fabrics trap air in them making them good insulators
- Is moisture-wicking and odour-resistant
- Fine wool fibres can be made into fine fabrics that do not crease
- Is lightweight
- Takes on colour dyes well
- Is biodegradable



Disadvantages

- Can feel itchy for some people
- Requires special care to avoid shrinkage
- Can be expensive
- Is affected by moths
- Shrinks with heat and moisture
- Absorbs odour

Fascinating Facts

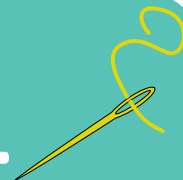
There are over 40 different breeds of sheep that produce over 200 different types of wool fibre! Wool absorbs and repels water at the same time! The outer surface of wool repels liquid but the inside absorbs water vapour.



Fold



Viscose (Rayon)



Advantages

- Is made from wood pulp
- Is soft and smooth with a silky feel
- Drapes well
- Is biodegradable
- Is versatile - it blends well with other fibres
- Is 'breathable'
- Does not trap body heat
- Is not expensive



Disadvantages

- Is not as durable as other fabrics
- Wrinkles easily
- It can shrink when washed
- Fibres are weakened when wet
- Production can be environmentally intensive

Fascinating Facts

Viscose was originally made as an alternative to silk.

Viscose is a fabric which comes from a natural and sustainable source (wood pulp), but it needs to be processed using many chemicals to become a fabric.



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Gather Your Evidence Table

| | What fabrics are used to make which clothing? | | | | | | |
|-----------------|-----------------------------------------------|------|-----------|---------|----------|-------|---------|
| | Cotton | Wool | Polyester | Acrylic | Elastane | Nylon | Viscose |
| Jumpers | | | | | | | |
| Shorts/trousers | | | | | | | |
| Shirts | | | | | | | |
| Skirts | | | | | | | |
| Ties | | | | | | | |
| Hoodies | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |

| Ranking (1 - most shedding, 5 - least shedding) | | | | | |
|--------------------------------------------------------------|--|--|--|--|--|
| Results of shedding test | | | | | |
| Fabric the uniform is made from | | | | | |
| Item of uniform | | | | | |