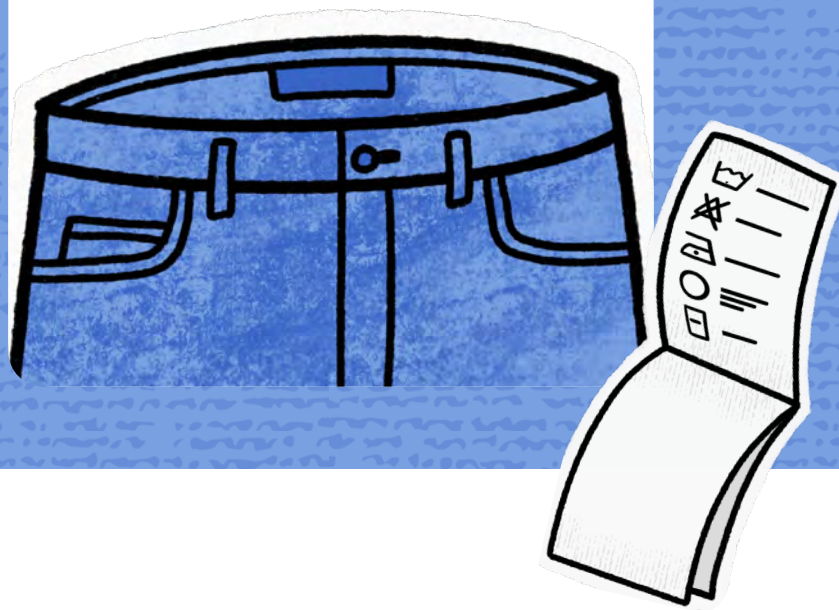


#2: What's behind the label? Denim Detectives



Summary

Clothing labels tell us where garments are made. However, if we want to know the full story of where our clothes come from – and what the full impact they have on people and planet is – we need to know more than just where they are made. We need to find out what they are made from and how these materials were produced. Many of us own a pair of jeans. **But what is the impact on the environment of making them?** Using a pair of jeans from the Our Changing Planet Gallery, learners work in groups to explore the information on the label, looking at the materials the clothing is made from.

This activity is designed to help learners to think about what material their clothes are made from and the environmental impact of our clothes.

At the end of this learners will

- have learnt and extracted key information about one garment to start to consider the environmental impacts of the fast fashion industry.

Time Frame

45 minutes

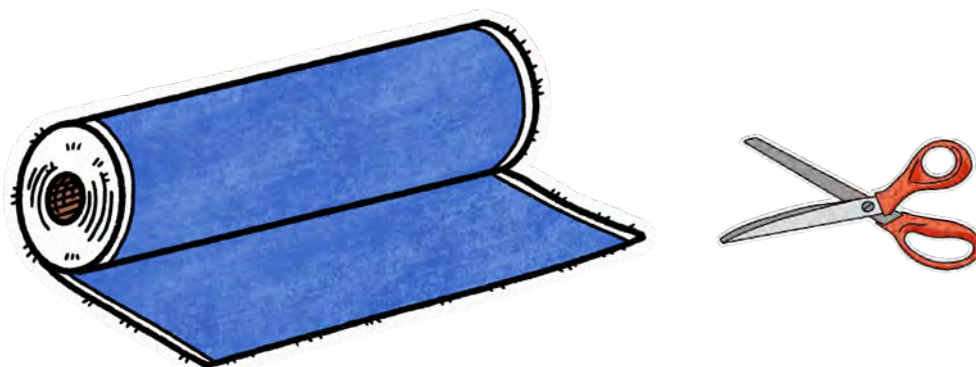
Lesson format

- Ask the question: What information doesn't your clothing label tell you?
- Overview of environmental impact of fast fashion industry.
- Garment case study: denim jeans.



- Group work: learning about the raw materials that the case study jeans are made from.
- Sharing and recording learning.

Notes: Denim jeans were chosen as a case study to encourage visitors to Our Changing Planet Gallery and learners using this resource to think about what they can do to make their use of resources more sustainable. Jeans are a good example because they're so relatable – they cut across age, gender etc and lots of people own at least one denim garment. We recognise that making changes to the way we think about and use our clothes is challenging and recognise that many people need to consider the financial impact of buying and wearing clothes. We recommend that you make sure you spend time discussing the ideas to make our use of denim more sustainable using slide 19, where we have tried to suggest low or no cost ideas. Remember: the most sustainable clothes are the ones you already have.



Key resources

- 2 Whats behind the label Denim Detective Presentation
- 2 Whats behind the label Denim Detective Activity 1 – Each group needs 1 sheet. You may also choose to enable each group to use a device to access the internet.
- 2 Whats behind the label Denim Detective Activity 2 – choose a template, then print 1 per learner

What to do

1. Ask the question. What information doesn't your clothing label tell you?
2. Slide 2 **Task 1** Complete the tasks to help explore the information contained in the fast fashion global impact poster.
3. Show slides 3- 5 and use the presentation to encourage discussion using a pair of jeans displayed in Our Changing Planet Gallery at Thinktank. These slides look at the information Thinktank has about the person who wore the jeans and what the clothing label tells us.

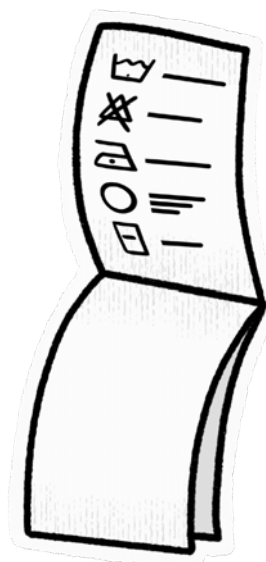
Discussion points:

Slide 3 : How many of you have and wear jeans?

Where do you think this pair was made?

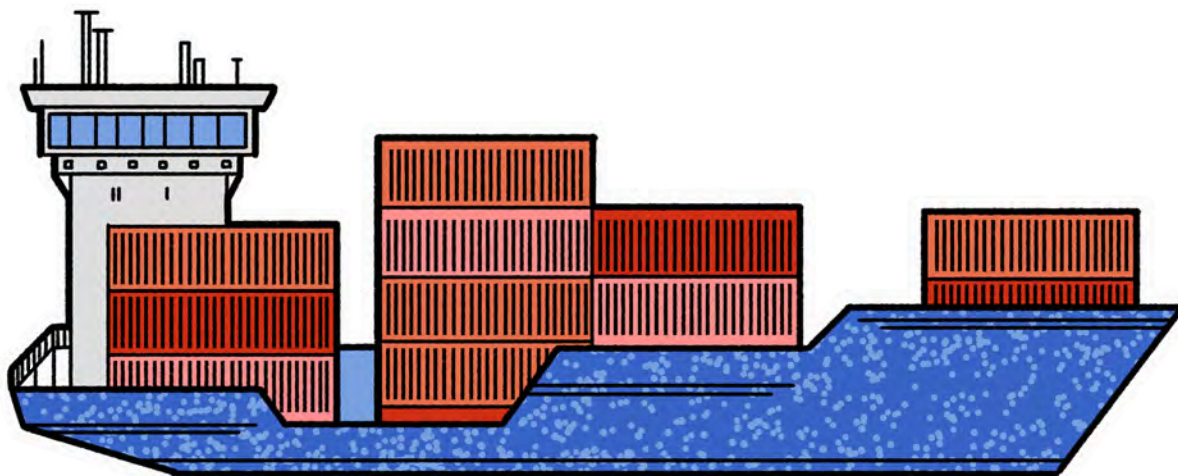
What material do you think they are made from?

Slide 4 : What interests you most about the personal story of these jeans?



Slide 5 : Are you familiar with the names of those materials?
Who do you think made the jeans?

4. Slide 6. These questions will help us think about how the production and transport of these jeans has affected our planet.



5. Learners split into 4 groups.

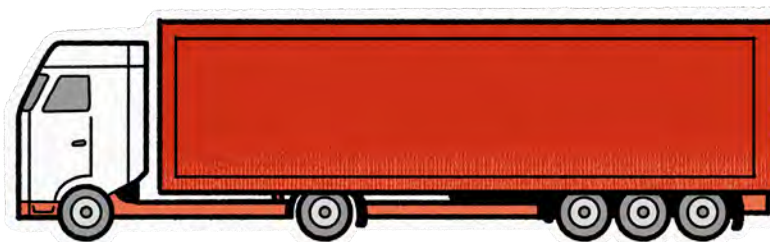
Slide 7 **Task 2** Each group uses the information in each section of the Presentation and links provided to research one of the raw materials (cotton, polyester, elastane, zinc alloy) used to make the denim jeans, and the impact that using that raw material has on the environment. They also need to plan how to share that knowledge with the wider group. Each group needs 2 sheets from 2 Whats behind the label Denim Detective Activity 1. You may also choose to enable each group to use a device to access the internet. You may also choose to support learners in this task using the activity sheet at the end of Activity 1.

(Notes:

Information in the research documents is footnoted to enable easy referencing, but not all learners will need to use it.)

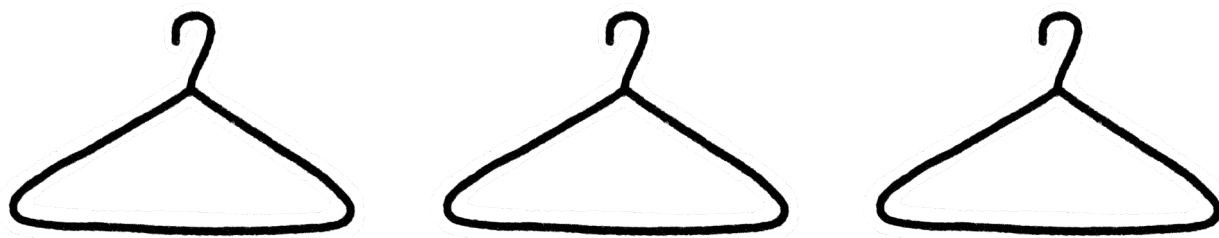
Links are saved on slides 8-15 to enable content such as images to be easily shared to the whole group, if individual research groups wish to do so.)

6. Slide 16 **Task 3** Learners share their knowledge about raw materials with whole group.
7. Slide 17 This slide briefly looks at how goods like materials and garments are transported around the world.



8. Slide 18 Suggestions for how to make different decisions as consumers when thinking about buying and wearing denim jeans. Spend some time discussing these. We have tried to suggest low or no cost ideas. Remember: the most sustainable clothes are the ones you already have.

9. Slide 19 **Task 4** Discuss what information learners would want to see on their clothes labels.



10. Slide 20 **Task 5** Learners create a Top Trumps style card about jeans using information they have learnt. Choose which template you want to use from 2 Whats behind the label Denim Detective Activity 2. Provide each learner with a copy. Decide a format of ranking. Out of 5? 10? 100?

If you select the blank template, discuss with the learners what categories they want to include and how will they rank them.

11. Slide 21 **Task 6** Discuss: Fast fashion – ‘inexpensive clothing produced rapidly by mass-market retailers in response to the latest trends.’

Are these jeans an example of fast fashion? Why? Why not?

Extension ideas

- Learners could create a Top Trumps style card for another garment of their choosing.
- It might even be possible to create a deck of Top Trumps cards to ‘play’ with and share information about different garments worn by members of the group.
- Try growing cotton plants in the classroom. <https://www.cottonacres.co.uk/growing/how-to-grow-cotton/>



Birmingham
Museums



thinktank
Birmingham science museum



UNIVERSITY OF
BIRMINGHAM



Fast fashion - global impact

The **fashion industry** is responsible for **10% of annual global carbon emissions** each year - more than all international flights and maritime shipping combined.⁴

Polyester uses less water and land than cotton but emits **more greenhouse gas per kilo**. Polyester production for textiles released about **706 billion kilograms** of greenhouse gas in 2015, the equivalent of **185 coal-fired power stations**.¹

The average person buys **60% more clothing** items today than they did 15 years ago. In addition, garments are now only **kept for half the amount of time** they used to be.²



The fashion industry uses **93 billion** cubic metres of **water** each year; enough to meet the **consumption** needs of **5 million people** - the population of Costa Rica.⁴

Currently **less than 1%** of clothes are recycled³

2017: Inditex-owned, fast fashion giant, **Zara**, was **fined** by the Brazilian government for sourcing clothes from workshops operating with **modern slavery conditions**.⁷

2021: UK based **Boohoo** is accused of failing to improve **poor working conditions** in its supply chain.⁵

It takes **2720 litres** of water to make a t-shirt. That's roughly equivalent to what **you'll drink** in **3 years**.⁶

Irrigation of two rivers for cotton crops has **reduced** the size of the **Aral Sea** (which was the 4th largest lake in the world) by **90%**. People have suffered **health consequences** and **job losses** as a result.⁸

Garment workers rarely earn a **living wage** and the current **covid crisis** has made matters worse. Workers **lost billions** in wages due to the pandemic and it's estimated that **3.5 million lost their jobs** in 2020.¹⁰

2013: **Rana Plaza** in Bangladesh **collapsed** killing **1,134 people** - mostly **garment workers**. It was the 4th largest industrial disaster in history. It highlighted the **hazardous working conditions** and the high risk of exposure to **employment injury** in this sector.¹¹

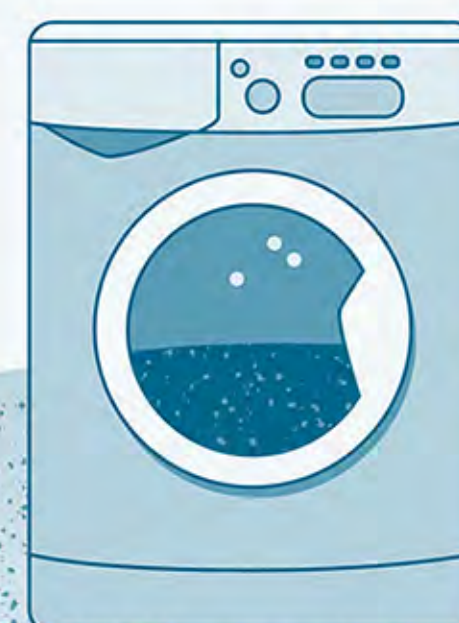
2016 - now: Millions upon millions of our **waste garments** end up in Accra, Ghana. A shocking **40% go straight to landfill**. A new, hygienic landfill site was built here less than a decade ago but it's already full and causing **dangerous pollution** for local people.⁹

20% of wastewater worldwide comes from **fabric dyeing** and treatment.²

Take action

- **Buy less.** Only buy clothes you'll wear a lot!
- **Love the clothes you already have**
- **Mend, swap and recycle** your clothes
- **Upskill!** Learn, and then teach someone else, how to patch or sew on a button
- Use social media to ask companies **#whomademyclothes** and **#whatsinmyclothes**
- Check out the work of **Fashion Revolution** and see what you can do to raise awareness

Each year **half a million tons** of **plastic microfibres** wash into our oceans - up to **700,000 fibres** in just one wash.²



1 <https://www.wri.org/insights/apparel-industrys-environmental-impact-6-graphics>
 2 <https://www.unep.org/news-and-stories/press-release/un-alliance-sustainable-fashion-addresses-damage-fast-fashion>
 3 <https://www.unep.org/forestry/press/un-alliance-aims-put-fashion-path-sustainability>
 4 <https://www.worldbank.org/en/news/feature/2019/09/23/costo-moda-medio-ambiente>
 5 <https://www.theguardian.com/business/2021/jun/18/boohoo-accused-of-failing-to-improve-working-conditions-in-its-supply-chain>
 6 https://www.fashionrevolution.org/wp-content/uploads/2016/03/FashRev_LoveStory_2017.pdf
 7 <https://www.mindthegap.ngo/harmful-strategies/constructing-de-niability/hiding-behind-complex-supply-chains/zara-fights-sanctions-for-forced-labour-in-brazilian-supply-chain/>
 8 <https://greenerdeal.com/news/environment/7059-the-aral-sea-disaster/>
 9 <https://borgenproject.org/fast-fashion-in-west-africa/>
 10 <https://www.theguardian.com/world/2021/apr/02/alta-gracia-dominican-garment-factory-living-wage-pandemic>
 11 https://www.ilo.org/global/topics/geip/WCMS_614394/lang-en/index.htm

Lesson 2: What's behind the label? Denim Detectives

98% cotton, so what is cotton?

Cotton is a natural material that grows around the seeds of the cotton plant.

The fibre can be spun into a thread and woven into a fabric.

You can learn more here:

<https://en.wikipedia.org/wiki/Cotton>

It is farmed in lots of countries, but the largest exporters of cotton are USA (36%) and India (15%)

A cotton 'boll' growing on the cotton plant. This seed pod is removed from the plant so the cotton fibres can be removed and used.

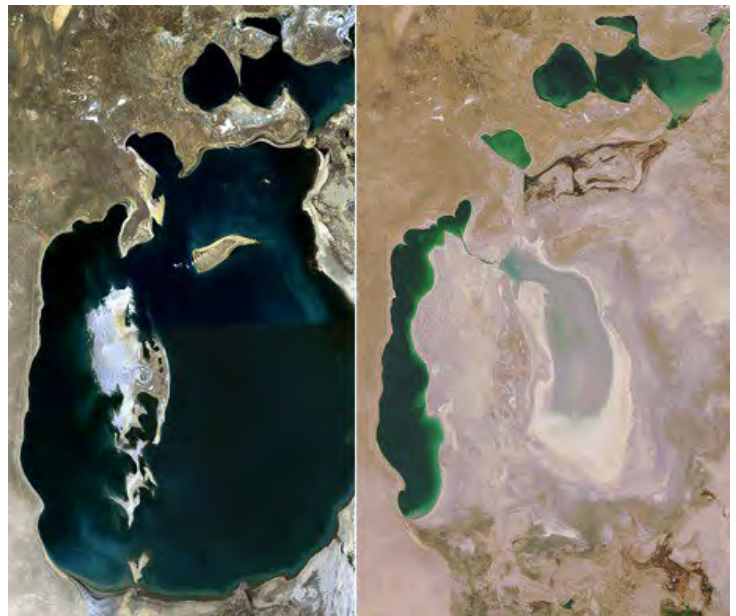


What is the environmental impact of cotton?

Growing cotton consumes 6% of all agricultural chemicals and 16% of all insecticides produced globally. Insecticides kill pests that threaten the crop, but they also wipe out a whole host of important creatures in the ecosystem, they damage soil, infiltrate into water systems and have a negative impact on aquatic life.

Cotton is a very thirsty crop to grow, requiring over 7,000 litres of water to produce just one pair of jeans. Irrigation of two rivers for cotton crops has reduced the size of the Aral Sea (which was the 4th largest lake in the world) by 90%.

Approximately 70 per cent of lakes and rivers across Asia are polluted by the toxic chemicals and waste water produced by the continent's textile industry.



A comparison of the Aral Sea in 1989 (left) and 2008 (right). Use of the water from the Aral Sea for irrigation has reduced its size by 90%.



Lesson 2: What's behind the label? Denim Detectives

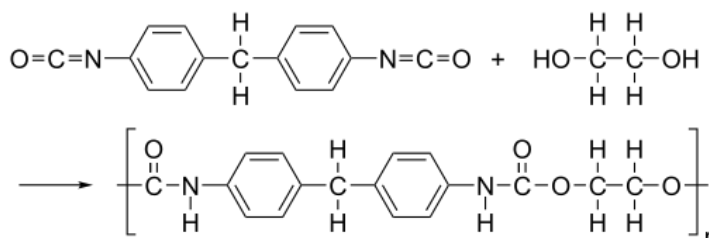
2% Elastane, so what is Elastane?

Elastane is also called by the brand names Spandex and Lycra. 'Spandex' is an anagram of 'expands'.

It is a synthetic fibre made of a long chain polymer called a polyester-polyurea copolymer. You can learn more here: <https://en.wikipedia.org/wiki/Spandex>

Elastane is petroleum based, so is made from non-renewable fossil fuels.

The largest exporters of Elastane are China, USA, and Germany.



The chemical structure of elastane.

What is the environmental impact of Elastane?

Elastane is petroleum based, so is made from non-renewable fossil fuels. Extracting and using fossil fuels like petroleum carries risks, including the potential for oil spills. Extraction can also lead to methane emissions which affects the Earth's atmosphere, and the infrastructure connected with this industry can also disrupt wildlife and lead to biodiversity loss.¹

Elastane is synthetic so is not biodegradable. When washed, clothes made of elastane shed microfibres. Microfibres are extremely small pieces of plastic resulting from the disposal and breakdown of synthetic products. Microplastics cause pollution of natural ecosystems, including marine habitats. Each year half a million tons of plastic microfibres wash into our oceans - up to 700,000 fibres in just one wash.²

Microplastics are extremely small pieces of plastic that pollute natural environments.



¹ <https://sciencing.com/list-7459738-environmental-impacts-oil-extraction.html>

² <https://www.plymouth.ac.uk/news/washing-clothes-releases-thousands-of-microplastic-particles-into-environment-study-shows>

Lesson 2: What's behind the label? Denim Detectives

The lining is 52% Polyester, so what is Polyester?

Polyester (polyethylene terephthalate) is derived from a chemical reaction involving petroleum, air, and water.

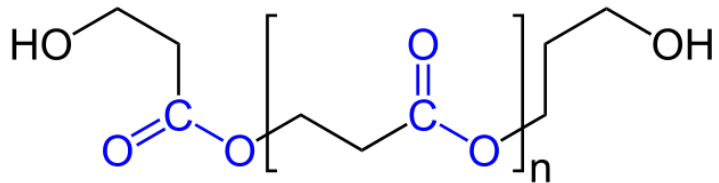
Polyester is a synthetic material.

Polyester fibres are sometimes spun together with natural fibres to produce a cloth.

You can learn more here: <https://en.wikipedia.org/wiki/Polyester>

The largest exporters of Polyester are China, Indonesia, India, Germany, USA, Netherlands.

The chemical structure of elastane.



What is the environmental impact of Polyester?

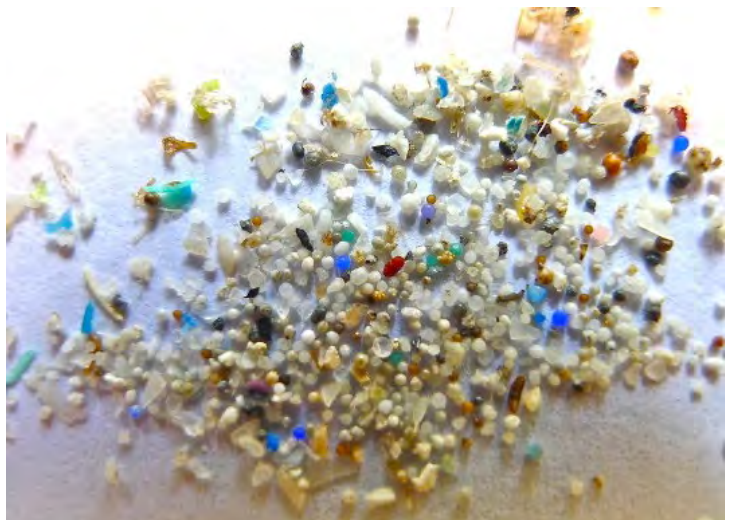
Polyester uses less water and land than cotton but emits more greenhouse gas per kilo. Polyester production for textiles released about 706 billion kilograms of greenhouse gas in 2015, the equivalent of 185 coal-fired power stations.³

When laundered, polyester sheds microfibres. Each year half a million tons of plastic microfibres wash into our oceans - up to 700,000 fibres in just one wash.⁴

Synthetic fabrics are usually produced from oil and account for 63 per cent of the material input for textiles production. The most common materials in textile production are polyester (55%), followed by nylon (5%), and acrylic (2%).⁵

Polyester fibres take a really long time to biodegrade. It could take more than 200 years for a dress made of polyester to biodegrade.⁶

Microplastics are extremely small pieces of plastic that pollute natural environments.



³ <https://www.wri.org/insights/apparel-industrys-environmental-impact-6-graphics>

⁴ <https://www.plymouth.ac.uk/news/washing-clothes-releases-thousands-of-microplastic-particles-into-environment-study-shows>

⁵ <https://www.wornforgood.com/blogs/blog/sustainable-fabrics-and-our-planet-which-fabrics-to-look-for-and-which-to-avoid>

⁶ https://issuu.com/fashionrevolution/docs/website_htbafr_booklet_bcxfr_print_

Lesson 2: What's behind the label? Denim Detectives

What about the 4 buttons?

These aren't listed in the materials list on the label, but they feel like metal. So let's look it up....

<https://www.sbs-zipper.com/blog/what-are-the-manufacturing-materials-of-metal-buttons/>

So, the 4 buttons might be Zinc Alloy, so what is Zinc Alloy?

A zinc alloy is made out of a mixture of zinc and aluminium.

Both zinc and aluminium are mined. 80% of zinc is mined underground from rocks in the Earth's crust.⁷ Aluminium can be mined from underground and open-pit mines, and is hidden in an ore called bauxite.

After mining, zinc and aluminium are extracted and processed so they can be used.

The largest exporters of zinc are South Korea, Belgium and Canada. The largest exporters of aluminium are Canada, Australia, China.



Small pieces of zinc alloy.

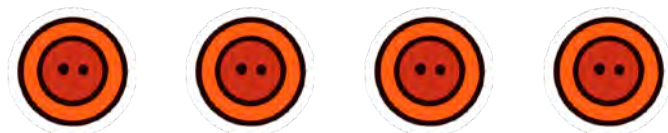
What is the environmental impact of Zinc Alloy?

Lots of aluminium is mined from open pit mines, meaning large areas of land are cleared and bulldozed to get to the bauxite. Clearing the land means cutting down trees and removing grassland and this results in habitat loss for plants and animals. It can also result in soil erosion. Mining and refining uses a lot of energy, resulting in Carbon Dioxide (CO₂) emissions.⁸

Zinc processing results in unwanted by-products that are corrosive and toxic to humans and animals. Processing results in high carbon dioxide emissions. Waste products from heating zinc can result in water pollution, affecting water living species.⁹



An open pit mine, which results in habitat loss.



⁷ <https://www.generalkinematics.com/blog/zinc-mining-processing-everything-need-know/#:~:text=The%20zinc%20mining%20process%20is,being%20mined%20through%20both%20methods.&text=In%20the%20foundry%2C%20the%20zinc,to%20take%20its%20final%20form>

⁸ <https://www.thesca.org/connect/blog/environmental-impact-aluminum>

⁹ [https://www.greenspec.co.uk/building-design/zinc-production-environmental-impact/#:~:text=Unwanted%20by%2Dproducts%20from%20zinc,%2Dforming\)%20and%20carbon%20dioxide.&text=The%20production%20of%20zinc%20produces,C02%20per%20tonne%20of%20zinc](https://www.greenspec.co.uk/building-design/zinc-production-environmental-impact/#:~:text=Unwanted%20by%2Dproducts%20from%20zinc,%2Dforming)%20and%20carbon%20dioxide.&text=The%20production%20of%20zinc%20produces,C02%20per%20tonne%20of%20zinc)

Task 2 : In your group, research one of the raw materials used to make the denim jeans and how that raw material impacts on the environment.

Name of material: _____

This material comes from: _____

The main countries this material comes from are: _____

One way that _____ impacts on the environment is _____

Another interesting fact I want to share about this is: _____

Task 3 Share your learning about the materials used to make a pair of jeans and the effect of using these materials on our planet. Plan in your group how you will share your learning. Who will speak? Do you want to show any pictures?



Lesson 2: What's behind the label? Denim Detectives

Garment: Denim Jeans**Social significance**

(Think about: How do people wear this garment? Who made this garment?)

Impact of non-renewable materials

(Think about: What materials is this garment made from? Are any of those materials made from fossil fuels?)

Impact on carbon emissions

(Think about: Where was this garment made? How was it transported?)

Impact on environment

(Think about: How are the materials used to make this garment extracted or made? Where was this garment made? How was it transported?)

One choice I can make differently

(How can you make a more sustainable choice in the future? Think about how you could buy, wear, or wash the garment and what you could do when you are finished with it.)

Most interesting fact:

Lesson 2: What's behind the label? Denim Detectives

Garment: _____	
Cultural significance (Think about: Who wears this kind of garment? Does this garment represent or symbolise any ideas?)	
Social significance (Think about: How do people wear this garment? Who made this garment?)	
Environmental significance (Think about: What materials is this garment made from? Are any of those materials made from fossil fuels? Where was this garment made? How was it transported?)	
Historical significance (Think about: When did this garment come into fashion? When were the materials used to make it first used?)	
Economic significance (Think about: Is this garment a luxury or everyday garment? What conditions was this garment made in? What is the global market for this kind of garment worth?)	
Most interesting fact:	

Garment: _____

