

# Process Flow, Lifecycle Analysis and Resources

## Process Flow.

The Process Flow diagram below shows you the steps taken to create a cotton T-shirt. Follow the green arrows to see how it goes from being cotton in a field to a finished product in a shop.



## How to reduce the footprint once the T-shirt is made and purchased?



1. Use it as long as possible
2. Repair it and continue to use it as long as possible
3. Give it away and have somebody else use it as long as possible
4. Re-design/upcycle it to prolong its life or give it new life in a new form as something else.



5. Recycle and convert the material into new material (mechanically or chemically).
6. Down cycle and convert into new material with lower quality or function than the original (mechanically or chemically).
7. Burn it
8. Throw it in the trash (if composting a cotton shirt under ideal conditions, it can decompose in about 15 months. Regular landfills are normally far from ideal conditions)



# The End of Life for a cotton T-shirt

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### Lifecycle Analysis

Life Cycle Analysis (LCA) is a method used to understand the environmental impact of a product through its life, covering extraction and processing of the raw materials, production, transport as shown in the Process Flow diagram above. For this challenge we have also included wearing and washing of the T-shirt and the options at the end of its life.

Use the headings in the template below to record what you learn from completing the 4 research tasks and jot down your ideas for ways to improve its environmental impacts at each stage. Once you have completed your analysis use the information to help you design your own upcycled T-shirt product or piece of art.

Stages	Research facts	Environmental impacts	Ideas of ways negative environmental impacts might be eliminated or reduced
1. Raw material analysis	•	•	•
2. Production analysis	•	•	•
3. Transport analysis	•	•	•
4. Use and end of life analysis	•	•	•

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**Resources:** The following links may be useful in helping you with your research.

### 1. Raw material analysis

- [Growing cotton - Environmental impacts of cotton production – Using less land to grow more cotton](#)
- [Fertilizers, pesticides](#) and [herbicides](#)
- [Use of water in the cotton lifecycle](#)
- [Genetically Modified Organisms \(GMO\) – bt GMO Cotton](#)
- [Greenhouse Gas Emissions collectively known as carbon emissions or CO<sup>2</sup>e](#)
- [Climate Change](#)
- [Air pollution.](#)

### 2. Production analysis

- [How is a cotton fabric made? – Sustainable Cotton from field to fashion](#)
- [How are t-shirts made? –](#)
- [Environmental impact of a cotton t-shirt](#)
- [The Lifecycle of a T-shirt](#)
- [Packaging](#)

### 3. Transport

- [Compare the carbon emissions from travelling 1,000 KM by different methods –](#)
- [Which transport method has the smallest carbon footprint?](#)
- [T shirt journeys/distribution](#)

### 4. Use and end of life analysis.

- [Detergents](#)
- [Micro fibres](#)
- [Sewerage treatment plants](#)
- [Waste Hierarchy – Changing clothing's environmental impact](#)
- [Clothing – reuse, upcycling, recycling, incineration – disposal to landfill](#)