

READY FOR THE CHALLENGE ?



United Schools

# Product life cycle Collage card game



## Difficulty



Medium



## Age of students



9 - 15  
years old



## Duration



1 month  
1h30

## Goals

- Discover the life cycle of everyday products
- Inform students about the issue of waste and show them the impact on the planet
- Discover the solutions available in waste treatment

## Supplies needed

- Cards
- Giant white paper
- Colored pencils
- Eraser
- White board (Option)
- Pair of scissors

## Description

This Collage card game is a set of 36 cards illustrating the life cycle of everyday objects, from the extraction of raw materials to their recycling. This activity is a good way to help students understand the functioning and the relationships between the different stages. This playful and concrete game will allow them to become fully aware of the impact of these products on the environment.

*If you are not familiar with this type of activity, discover our guide (solution included) : [HERE](#).*

Here are the different steps of the activity :

**1st step :** Explain the rules of the game to students.

**2nd step :** Divide the students into two groups, just to facilitate their management. The two groups will do the same activity, but separately.

**3rd step :** Spread the giant white paper on the ground and open the first set of cards.

**4th step :** In each group, distribute the first set of cards to students. They have to place the cards on the giant white paper in the way that makes the most sense to them.

**5th step :** Distribute the second and third set of cards to students. Here again, they have to place the cards on the giant white paper in the way that makes the most sense to them. From this step, ask them why they put the cards in this position, in order to assess their knowledge and sensitivity about environmental preservation and more precisely about waste management. After each of their answers, the teacher will confirm or deny what each said by bringing more information. The teacher will proceed this way until the distribution of the 8th set of cards.

**6th step :** Make sure that the cards are well placed, then give the students colored pencils to draw arrows and link the different cards between them. The aim is to get a complete scheme encouraging students to be careful about waste management.

**7th step :** Distribute the 9th set of cards to students and ask them to fill the cards with all the good ideas they have to reduce waste.

**8th step :** Debrief with the students. Ask them about what they liked the most, what they learned and what they would during which each student will say what he liked the most and what they would like to set up at their level to reduce waste.

**9th step :** Take pictures of the Collage and share your work on the United Schools platform!

#### **Card sets :**

**Set 1 :** Raw product

**Set 2 :** product transformation

**Set 3 :** distribution and transportation

**Set 4 :** Point of sale

**Set 5 :** Product in the state of waste

**Set 6 :** waste transformation

**Set 7 :** negative impacts on the environment

**Set 8 :** good practices

**Set 9 :** What do you decide to do today to save the planet?

## Set 1: raw product



**Natural fiber** known for its rapid growth and diversity of uses, the cotton is mainly produced in China, India, in the United States and Brazil. Over the past decade, the use of textile products has increased significantly as a result of income and demographic growth in Asian countries. Like many agricultural products, cotton cultivation is threatened by **climate change**.



**Oil** is a fossil fuel energy source mainly composed of hydrocarbons and is one of the pillars of the industrial economy by providing the majority of liquid fuels. Its refining is the basic source of petrochemicals such as **plastics, synthetic textiles and cosmetics**. Oil exploitation is currently one of the main causes of **climate change** because of the extraction, refining and fuel combustion.



**Sowings** are seeds selected for sowing, they are the basis of agricultural productions such as **cereals, vegetables or some fruits**. The selection of the best seeds is carried out since the appearance of **agriculture**. We are trying to reproduce the most climate-resistant seeds, the ones that yield the most and have the best nutritional qualities.



**Lithium** is an alkaline metal with many properties including high electrochemical potential and high energy density. These features place it in first choice materials for the manufacture of **batteries and electrodes**. Very reactive, it does not exist in the natural state and must be extracted from pegmatite type rocks, as well as clays or brines.





## Set 2: product of transformation



**Looms** are machines used for the transformation of plant fibers into fabric. The «flying shuttle» invented by J. Kay in 1733 is considered as the first key invention of the industrial revolution. It allows the **mechanization** of weaving even before the invention of the steam engine. Today, textile production is largely mechanized and China is the leading producer and exporter of textile products in the world.



The **refinery** is an oil processing and transformation chain that produces many commercial products. Simple refineries only allow the production of **fuels** such as gasoline or kerosene by atmospheric distillation. Complex refineries allow more processing, including the production of **plastic** by polymerization.



The world's **plant crops** are mainly used for **food** (for humans and animals) and are dominated by wheat, maize and rice. Farming requires **fertile land**, rain or irrigation, and sometimes inputs such as fertilizer. The value of global agricultural production represents 4% of global GDP and employs 1.1 billion agricultural workers, which is more than a quarter of the world's total employment share.



**Lithium salts** ( $\text{Li}_2\text{CO}_3$ ) can be produced from brines pumped into salt lakes (salars), which are allowed to evaporate for months. Chile (Atacama Salar), Argentina (Arizaro Salar) and Bolivia (Uyuni Salar), form the "**lithium triangle**" and account for more than 80% of the world's reserves. Excessive lithium mining in these **desert regions** threatens ecosystems and water accessibility for local populations.





## Set 3 : distribution and transportation



The International Maritime Organization (IMO) estimates that carbon dioxide emissions from maritime transport were equal to 2.9% of global emissions due to human activity in 2018. The emission of **fine particles** is the first source of pollution generated by **marine transport**, in addition to oil spills that pollute the oceans. The collisions with marine fauna cause 70% of cetacean deaths.



**Air freight** is an important part of air transport with 58 Megatonnes carried in 2019. The **climate impact** of air transport results mainly from the combustion of kerosene in reactors that emits CO2 into the atmosphere and contributes to the greenhouse effect that causes **global warming**.



An important part of goods are transported by **truck** via the road network. The environmental impact of this means of transport is both local with **noise pollution** and global with **air pollution**. Road transport is the leading cause of pollution in large urban areas and is responsible for 20% of global CO2 emissions in 2014.



**Rail freight** is a more sustainable and environmentally friendly alternative. It only represents a small part of the world's freight transport. Its development requires the construction or maintenance of important infrastructure and the sector has been losing speed for several decades, in favor of road transport, which is more affordable.





## Set 4 : Point of sale



Nearly 100 billion **clothes** are sold each year, which represents an increase of 50% compared to 2006, largely due to fast fashion. The sector now emits more CO<sub>2</sub> than air and sea transport combined, and uses 79 billion cubic meters of fresh water per year, while the production of raw materials and textiles also contributes to water pollution.



Global **plastic** production is growing exponentially, from 2.3 million tons in 1950 to 162 million in 1993 and 448 million in 2015. The main plastic market is **packaging**, 40% of the plastic produced is only used once before being thrown away and only 9% of the waste is recycled.



Worldwide, 500 million tons of **fruits** and 700 million tons of **vegetables** are produced by the Fruit and Vegetable sector. The transport of these products to points of sale in Western countries requires long journeys with a high carbon footprint to ensure the freshness of the products.



The demand for **electronic components** has exploded in the last decade for the production of **cars, graphics cards, game consoles or various electronic devices**. Since 2020, we have observed a shortage of electronic components worldwide due to many factors including the Covid-19 pandemic or the trade war between China and the United States.





## Set 5 : Product in the state of waste



It is estimated that **textile** production generates 20% of waste made up of fabric scraps. To this figure is added all the clothes thrown away each year by consumers. On average, only 1% of clothes are recycled into new clothes and Europeans throw away 11 kilos of textiles per year. 87% of these 11 kilos are incinerated or landfilled.



79% of the world's **plastic waste** goes to landfills and is **not recycled**. In France, only one fifth of waste is recycled, while 41.7% is incinerated and 39.1% is buried according to the Agency for the Ecological Transition.



**Food waste** represents 1.3 billion tons of food a year, or 1/3 of the total production of food for consumption, and this figure has doubled since 1973. According to the FAO, 54% of this waste occurs upstream of the chain (production, harvest, handling) and 46% downstream (processing, distribution, consumption).

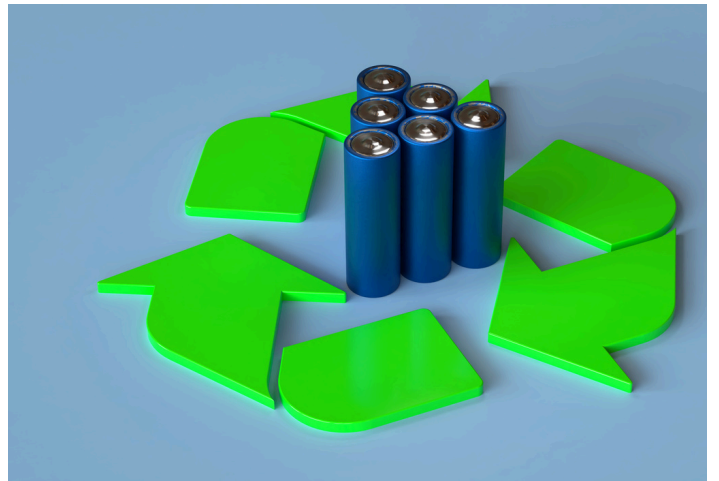


The **recycling of lithium electronic components** is a complex but feasible process that is accelerating in recent years, especially in China and South Korea where components are now finishing their life cycle. In Europe in 2020, 47% of accumulators and portable batteries were collected for recycling (EuroStat). Globally, 50% of the components are recycled.





## Set 6 : Waste transformation



**Recycling, collection points, resale or donations**, there are many ways to reuse your used clothes or past fashion. When they are recycled, the garments are frayed to transform the old non-reusable garments into **textile fibres** that can be reused by the industry to create new garments.



Not all **plastics** are recyclable because they are **too thin or too light**, but the vast majority have the recycling logo and the PET label for «polyethylenes terephthalates», a plastic that is very commonly used and fully recyclable. During recycling, plastics are crushed and resold to plastics manufacturers in the form of flakes or plastic granules.



**Composting** is a process of transforming organic waste (kitchen waste, green waste, wood, etc.) by microorganisms and small animals that will transform the waste into a product comparable to **soil** that can be used as **fertilizer**. It is therefore an environmentally friendly and easy solution to reduce these materials destined for landfill or incineration.



The **recycling of batteries** and electronic components is technical and sometimes expensive but the most efficient methods allow to recover up to 100% of lithium and cobalt, 98% of manganese and 75% of aluminum present in these components. Recycling stations for these components have been emerging over the past decade and progress in the field is fast and promising for the future of recycling electronic components.





## Set 7: negative impacts on the environment



It is estimated that textile production is responsible for about 20% of the world's **drinking water pollution**, due to dyes and other finishing products. Also, synthetic clothing is responsible for 35% of microplastics released into the environment and oceans (14 million tons), especially during the first washes.



Only 9% of plastic waste is **recycled** worldwide and each year 14 to 35 million tons of plastic end up in the aquatic environment. This **pollution** creates great risks for marine animals in particular and, ultimately, for humans. The low degradability of plastics leads to a long-term risk. Most plastics can take up to 400 years to naturally disappear.



The current **agricultural production** system is dominated by large agricultural firms. About 1% of holdings manage 70% of the world's agricultural areas. The use of **fertilizers and pesticides** is particularly widespread and can have very serious consequences on the quality of soil, water and even directly on human health.



The mining of lithium is very **energy-intensive** and therefore responsible for significant greenhouse gas emissions through the use of mining machinery, the electricity grid and the transport of materials. Extraction from brine is much less polluting but requires a large consumption of water in already arid environments.





## Set 8 : good practices



The **three pillars** for a more responsible consumption are:

- **reduce or limit** one's consumption to what is necessary for us,
- **reuse or repair** broken or end-of-life items before throwing them away,
- **recycle** each product using the sorting terminals adapted to its material.



Learn more about recycling:

- **Paper and cardboard:** everything can be recycled provided that the packaging is properly emptied
- **Plastic:** it is possible to recycle bottles, remember to read the sorting instructions on the packaging.
- **Glass:** Glass has an infinite recycling cycle since it is melted before being reused.
- **Metal:** it is possible to sort cans, aluminum and aerosols.



**Sort, repair or give,** there are many ways to give a second life to your clothes which became too small or out of fashion.

**Second-hand** clothing purchases in thrift stores or online stores are the best way to fight **fast-fashion** and the **pollution** it generates!



If you are lucky enough to have a garden, it is possible to install a **composter** to recycle your kitchen waste.

To succeed with your compost, put the right waste inside and think about **aerating and moistening** your compost regularly (once a month) to ensure the decomposition of your waste.

After a few weeks, you can recover your **soil** to feed the plants and vegetables in the garden!





## Set 9 : What do you decide to do today to save the planet?




Need some help ?

