

Etkinlik 1.7: Tartışma için rol kartları - İkilem

Kuruluşun rolü ve amacının tanımı (ilgili ise) (örn. üretici, hükümet, çevre örgütü, tüketici, sağlık örgütü, hayvan koruma grubu)	
Tartışmadaki ana duruş noktası/ifade	
İfadeyi doğrulamak ve pozisyonu savunmak için argüman(lar)	
Diğer (tanımlanmış) gruplardan gelebilecek olası eleştiriler	
Yukarıda belirtilen grup(lar)dan gelen eleştirilere karşı savunma	

Faaliyet 5.2: Yaşam Döngüsü Değerlendirmesi (LCA) için Şablon

Bu tablo şablonunu, iki farklı materyale ilişkin analiziniz için bir çerçeve olarak ve materyallere çeşitli açılardan bakmanıza yardımcı olması için kullanın.

	Orijinal plastik şişe	Alternatif malzemeden şişe
Hammaddelerin çıkarılması - örneğin toprak, arazi, tohum, gübre, sulama		
Üretim ve işleme - örn. ısıtma, su, havalandırma, elektrik		
Ulaşım - örn. kamyon, demiryolu, uçak		
Kullanım ve ticaret - örn. tek kullanımlık veya yeniden kullanılabilir, yaşam döngüsü		
Atık bertarafı - örn. yenilenebilir/yenilenemez Hammadde, enerji tüketimi, kirletici salınımı		

Faaliyet 5.2: Bilgi ve bir örnek Yaşam Döngüsü Değerlendirmesi (LCA)



Quarterly Problem

- Green Edition -

Life Cycle Assessment – how to do it



→ *Creating a life cycle assessment (LCA) is a really exciting, but also really challenging task. Have you ever wondered, for example, how sustainable the milk is that you put in your cereal for breakfast? No? Then you're not alone - but it's worth thinking outside the box, and it's a lot more exciting than you might think. Because only then can we really understand the impact this product has on the environment. Let's start with this example and see how we could build up an LCA.*

Let's start by taking a close look at our product. What do we have in front of us? Sure, the contents: milk. What else? The carton. What is it made of? Not so easy. Maybe we'll have to ask Google. What's missing? Hmm... there is probably a screw cap. It is made of hard plastic. And the carton is also printed with logos, information and advertising texts. You definitely need ink for that.

These four rough components are best sorted into a table:

Milk	Carton	Screw cap	Print
------	--------	-----------	-------

Now the really exciting work begins: We embark on a journey with the product. How are these raw materials obtained, what resources are used for this purpose, and what path does the component of our milk carton take before it is assembled into the finished product including the contents? How often is it used before it ends up in the dustbin, and can it be recycled?

In order to get a better overview, let's take a look at the various "life phases" of a product and what you should consider:

- **Extraction of raw materials** - e.g. soil, land, seed, fertilizer, irrigation
- **Manufacturing and processing** - e.g. heating, water, ventilation, electricity
- **Transportation** - e.g. truck, rail, airplane
- **Use & trade** - e.g. disposable or reusable, life cycle
- **Waste disposal** - e.g. renewable/non-renewable raw materials, energy consumption, release of pollutants



In all these considerations, it is useful to pay attention to the following parameters:

- **Greenhouse gas emissions**, e.g. carbon dioxide (CO₂) or methane (CH₄)
- **Water consumption**
- **Land consumption** (e.g. through cultivation of raw materials: On average, how many m² of land must be planted to feed one cow?)

Now evaluate the individual components and then the total product. **Attention, no exact result can be achieved here.** You will probably work a lot with assumptions and speculations, but that is quite normal.

What is the approximate impact of this product on our environment? Can you think of alternatives that are more sustainable? Think about it carefully, after all, you might be the product developer of tomorrow 😊

© Hannah Morrison /International Centre for STEM Education (ICSE), 2021
CC-BY-NC-SA 4.0 License granted
Picture Source: Pixabay.com/de



International Centre for STEM Education (ICSE)
University of Education Freiburg · Kunzenweg 21 · 79117 Freiburg
icse@ph-freiburg.de · www.ph-freiburg.de/icse



Pädagogische Hochschule Freiburg
Universität des Saarlandes · University of Education



Faaliyet 5.2-5.4

Sources to knowledge – Energy used for production of materials

| 102

Material	Relative primary energy used
Steel	XXXXX
Plastics (PE, PVC, PP, PET)	XXXX
Paper and cardboard	XX
Cement	XX
Al alloys	XX
Noble metals (Au, Ag, Cu etc.)	x

Source: <https://royalsocietypublishing.org/doi/pdf/10.1098/rsta.2012.0003>

| 103

Sources and ideas to knowledge and for presentation - Relative Benefit of Cardboard and Plastics

Table. Visualized approx. relative environmental benefit of cardboard and plastics in applications. Both are valued as equal according to functional need.

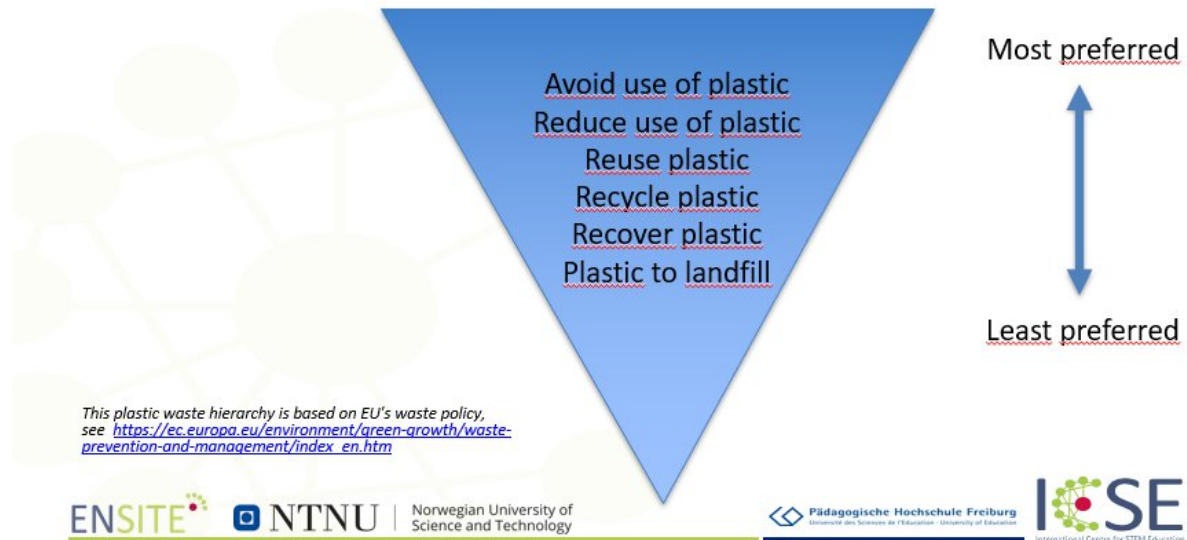
	Cardboard	Plastics
Renewable raw material	++++	+
Recycled resources	+++	++
Ease of Recycling	+++	++
Durability (benefit)	++	+++
Carbon Footprint	+++	+++
Packing Waste Costs	+++	+++
Lightweight	++	+++

<https://www.procarton.com/wp-content/uploads/2018/06/PC-Carton-Plastic-Sustainability.pdf>

Faaliyet 5.2-5.4

| 91

Plastic waste hierarchy



| 104

Sources to knowledge - Paper/cardboard vs. Plastic European amount of litter, Beach litter and Breakdown

	Paper and Cardboard	Plastic
Total packing waste	XXXXXXXXXX	XXXX
Potential for landfill and leakage	X	XX
European beach litter collected	X	XXXXXXXXXX

Source: <https://www.procarton.com/wp-content/uploads/2018/06/PC-Carton-Plastic-Sustainability.pdf>

Paper breakdown takes months vs. Plastic breakdown takes centuries!

Faaliyet 5.1-5.4

Bilgi kaynakları - bilgi, istatistik ve hesap makineleri

- Malzeme üretimi için kullanılan enerji
<https://royalsocietypublishing.org/doi/pdf/10.1098/rsta.2012.0003>
- Karton ve plastiğin göreceli faydası
<https://www.procarton.com/wp-content/uploads/2018/06/PC-Carton-Plastic-Sustainability.pdf>
- Su ayak izi hesaplayıcısı:
<https://www.watercalculator.org/>
- Çevresel ayak izi hesaplayıcısı. Karışık kağıt, karışık malzemeler, hurda metal ve elektronikleri karşılaştırın:
<https://www.montgomerycountymd.gov/sws/footprint/>
- Karton ve plastiğin faydası:
<https://www.procarton.com/wp-content/uploads/2018/06/PC-Carton-Plastic-Sustainability.pdf>
- Su tüketimi - Plastik şişeler vs. alüminyum kutular:
<https://www.reuters.com/article/us-environment-plastic-aluminium-insight-idUSKBN1WW0J5>
- CO2 etkisi - cam vs plastik şişeler:
<https://ecochain.com/story/case-study-packaging-plastic-vs-glass/>
- Malzeme üretimi için kullanılan enerji:
<https://royalsocietypublishing.org/doi/pdf/10.1098/rsta.2012.0003>
- Sıralama: beş farklı meşrubat kabının çevresel etkisi
<https://theconversation.com/ranked-the-environmental-impact-of-five-different-soft-drink-containers-149642>
- Sütü cam, plastik veya karton kaplarda mı satın almalıyım?
<https://slate.com/technology/2011/03/should-i-buy-milk-in-glass-plastic-or-cardboard-containers.html>
- Kartonlar ve Plastik Kaplar (Film)
<https://www.youtube.com/watch?v=lxg9F2CC89k>

