Lesson Plan Template - Cosmetic & Cleaning products industry – Alternative solutions

Target Audience

Vet Trainers

Goal (50-60 words)

The main goal of this lesson plan is identification of sustainable alternatives in the cosmetics and cleaning products industry and researching and implementing innovative technologies and production methods that minimise environmental impact. Participants will learn how alternative technologies and raw materials can contribute to more responsible production and environmental protection.

Objectives (1-3 Objectives)

- Identification of sustainable alternatives in the cosmetics and cleaning products industry.
- Researching and implementing innovative technologies and production methods that minimise environmental impact.

Today's world including industry, as with many other sectors and fields, faces numerous environmental challenges. This also applies to the cosmetics and cleaning products industry. Traditional raw materials and production technologies have a significant impact on the consumption of natural resources, environmental pollution and waste generation. It is important to change production technologies, raw material extraction and packaging in order to reduce environmental impact. It is therefore very important to understand these issues:

Natural and synthetic raw materials: Natural raw materials, such as palm oil, are an ingredient in up to 50% of products available on shop shelves, but their extraction often leads to deforestation. Therefore, certified sources such as the RSPO are crucial. On the other hand, synthetic raw materials such as biopolymers offer solutions with less environmental impact.

Types of packaging: Single-use plastic is a major environmental problem. New solutions include biodegradable plastics, recycling of plastics such as PET and HDPE, and the use of recycled materials.

Production technologies: The water footprint and carbon footprint are the most significant for environmental degradation. Waterless production is one example of innovative solutions that minimise water and energy consumption. Companies are developing technologies that reduce resource consumption and optimise production processes, thereby reducing their carbon footprint.

The production of cosmetics and cleaning products should be based on the selection of materials that are renewable and have a minimal impact on the environment. The raw materials used to make them should come from responsible sources, such as fast-growing plants that require little water and are not dependent on the use of pesticides. Plastic is still a commonly used material for packaging, but its impact on the planet is enormous. It is true that there are types of plastic that can be recycled, but this process requires proper segregation and processing. There are types of plastic that produce granulate that can be used to make other items. However, it is necessary to reduce the use of plastic and look for alternative materials, such as biodegradable polymers or natural raw materials. Manufacturing processes require water and energy, so a sustainable approach is to reduce the use of these resources or to source them sustainably. Examples are renewable energy sources, such as solar or wind power, and water recycling.

Lesson Plan Details

Lesson Plan title	Cosmetic & Cleaning products industry – Alternative solutions

21st Century Skills	Critical Thinking Problem-solving Creativity
Duration	*Activity 1: 25 minutes* *Activity 2: 30 minute* *Activity 3: 15 minutes*
Classroom setting	The class needs to be organized for the lesson in groups.
Required material/resources	*Activity 1:* ● *Game cards* ● *Flipchart/game board* *Activity 2:* ● *Paper (A4/A3)* ● *Pens/markers/paints* ● Smartphones or other devices with Internet connection
Prerequisites	*Knowledge of various alternatives used in the cosmetics or cleaning products industry*
Final Assessment (if applicable)	Group project
Additional resources	List any additional resources that the target audience can use to help them implement the lesson plan.
References	Insert all the research resources you used in APA style (you can use this <u>guide</u> to help you cite your references, such as books, online resources, online journals and more).

Lesson Plan for Activities & Scenarios #1 (include 1-3 activities & 1-2 scenarios)

Activity 1: "Ecological Footprint" Game

Divide the participants into groups. Each group draws cards representing various topics. The aim of the game is to assess the ecological footprint of each element and place them on a scale from the least to the most environmentally friendly solutions. You may also consider using a point scale, e.g., 1–10, where 1 represents the greatest negative environmental impact, and 10 represents the most eco-friendly solution.

The teacher moderates the discussion and asks questions:

- What are the biggest challenges associated with the selected technologies?
- Which alternatives have the least environmental impact?
- What factors should be considered when choosing sustainable technologies?

<u>Objective of the game</u>**:**
The aim of the game is to assess the impact of various raw materials, packaging, and production technologies on the environment. Participants analyse which solutions are the most eco-friendly and which have the most negative impact on the environment.
<u>Game rules</u>**:**

1. Divide the students into several groups (e.g., 3–5 people per group).
2. Each group draws 3 cards from different categories (1 card from the "Raw Materials" category, 1 card from the "Packaging" category, and 1 card from the "Production Technologies" category). The cards contain brief descriptions of these technologies, including key information about their environmental impact.
3. Placing cards on the ecological scale**:**
   Each group analyses its cards and jointly decides where to place their solutions on the ecological scale. They should place them appropriately on a line from "least eco-friendly" to "most eco-friendly".
   Example: RSPO-certified palm oil might be placed closer to the "more eco-friendly" end of the scale compared to "microplastics". Biodegradable packaging could be closer to the eco-friendly end, while single-use plastic (PET) would be closer to the "least eco-friendly" end.
4. Discussion**:**
   Each group justifies its decision on why they placed their solutions in a particular position on the ecological scale. The teacher may ask additional questions to encourage students to deepen their reflection: Why did you choose this solution as more eco-friendly? Are there other technologies or raw materials that could be better for the environment? What could make less eco-friendly solutions more environmentally friendly?

Activity 2: Practical Workshop – Designing Eco-Friendly Products
Get creative! Divide into groups and design a new cosmetic product or cleaning agent that meets the criteria of sustainable development. You must choose the right raw materials, packaging, and production technologies, and then develop a strategy for bringing the product to market. During the workshop, consider:

- Which raw materials are the most environmentally friendly?
- What packaging minimises waste?
- What production technologies reduce resource consumption?

<u>Objective of the exercise</u>**:**
Participants are tasked with designing a new cosmetic product or cleaning agent that meets sustainable development criteria. The group's task is to develop a strategy that includes choosing raw materials, packaging, and production technologies that minimise environmental impact.
Present your product idea on a poster, showcasing:

1. Your product in general – its purpose and other basic information.
2. The raw materials used and their environmental benefits.

3. The type of packaging.
4. The production technology.
5. The marketing strategy.

You have a maximum of 3–5 minutes to present your project, after which other groups may ask you questions about your idea.

Activity 3: Debate "Can Technology Save the Environment?"
Today, you are business professionals. You will form two opposing "sides" and debate whether technology can save the environment. Conduct a debate on the role of technology in reducing the negative impact of the cosmetics and cleaning industries on the environment. One group will argue that innovative technologies can significantly reduce the industry's ecological footprint, while the other group will focus on the limitations that may arise when implementing them (costs, availability, scale).
Debate questions:

1. What innovative production technologies can significantly reduce the ecological footprint of the cosmetics and cleaning industries?
(e.g., waterless production, renewable energy, low-emission technologies)
2. Is plastic recycling a sufficient solution to address the excessive use of single-use packaging in the cosmetics industry?
(Are other, more innovative approaches, such as reusable or biodegradable packaging, necessary?)
3. Does the production of certified raw materials, such as RSPO-certified palm oil, genuinely reduce environmental impact?
(What are the alternatives to certified raw materials?)
4. Are waterless production technologies a realistic solution that can be implemented on a large scale in the cosmetics industry?
(What are the potential limitations and challenges in their implementation?)
5. Can cosmetic companies reduce their CO_2 emissions by adopting low-emission technologies, such as production using renewable energy?
(Is it possible to implement such solutions without significant costs for consumers?)
6. Are consumers willing to pay more for products that are manufactured in an eco-friendly manner using new technologies?
(What factors influence consumer choices? Price, environmental awareness, product availability?)
7. What are the biggest barriers to implementing innovative, eco-friendly technologies in the cosmetics and cleaning industries?
(Are financial and technological barriers the biggest obstacles? Or is it the lack of proper regulations?)
8. Can technology fully replace natural processes in creating eco-friendly products, or is it necessary to seek more sustainable raw materials?
(Can synthetic materials be more eco-friendly than natural ones if properly produced and used?)
9. What actions can governments and international organisations take to speed up the adoption of sustainable technologies in the cosmetics industry?

(Are packaging and emission regulations sufficient? What policies can motivate companies to adopt more eco-friendly practices?)
10. How important is consumer education in promoting eco-friendly products?
(Can informing customers about sustainable practices genuinely change their purchasing choices? What marketing strategies are most effective?)

These are, of course, sample questions that you can use. You can also develop your own or enhance the entire exercise by selecting a student to lead the debate. Each question can also be posed to both groups alternately, allowing each to prepare a response. After each round of arguments, the other group may ask questions to their opponents to deepen the discussion. At the end of the debate, you can conduct a brief summary, during which everyone can share which arguments were the most convincing.
Have fun!

Assessment:

Each group is tasked with preparing a multimedia presentation about their project from **Activity 2 – "Designing Eco-Friendly Products"**. Presentations must include justifications for the choice of raw materials, packaging, and technologies, as well as an evaluation of their environmental impact.

Attachment – game cards:

RAW MATERIAL CARDS

DESCRIPTION	INFORMATION FOR THE TEACHER
Palm Oil (Non-Certified) Palm oil is one of the most popular raw materials in the cosmetic and food industries. Its production often leads to the deforestation of rainforests, which threatens biodiversity and contributes to climate change.	**Ecological Footprint**: Very high (negative impact).
RSPO-Certified Palm Oil Certified palm oil comes from plantations that are managed according to sustainable development principles. The RSPO (Roundtable on Sustainable Palm Oil) certification ensures that the raw material does not contribute to deforestation or environmental degradation.	**Ecological Footprint**: Medium (sustainable, but still an intensive production process).
Coconut Oil Coconut oil is a natural raw material widely used in skin and hair care products. However, its production impacts the	**Ecological Footprint**: Medium.

environment, as it requires large amounts of water and is often transported over long distances.	
Shea Butter Shea butter is a natural raw material primarily sourced in Africa. It is known for its moisturising properties and is used in many cosmetics. Shea butter is traditionally sourced, and its cultivation has a minimal environmental impact.	**Ecological Footprint**: Low.
Microplastics Microplastics are small plastic particles used in exfoliants and other cosmetics. They do not biodegrade and easily enter aquatic ecosystems, where they can pollute waters and threaten marine organisms.	**Ecological Footprint**: Very high (negative impact).
Algae Oil Algae oil is an innovative, sustainable raw material that can be produced without harming the environment. Growing algae requires fewer resources than traditional plant-based raw materials.	**Ecological Footprint**: Low.

PACKAGE CARDS

DESCRIPTIONS	INFORMATION FOR THE TEACHER
Single-Use Plastic (PET) Single-use plastic (PET) is commonly used to produce bottles and cosmetic packaging. Although it is recyclable, much of the PET packaging is not recycled and ends up in landfills or oceans, where it can take hundreds of years to decompose.	**Ecological Footprint**: High (negative impact).
Recycled Plastic (rPET) Recycled plastic (rPET) is made from recovered PET, reducing the use of virgin raw materials. However, recycling plastic requires energy, and not all rPET packaging is fully recyclable after repeated uses.	**Ecological Footprint**: Medium (sustainable, but with limitations).
Biodegradable Packaging (PLA) Biodegradable packaging made from PLA	**Ecological Footprint**: Low (very eco-friendly).

(polylactic acid) is produced from renewable resources like corn.	
Glass Glass is a fully recyclable material and is often used for cosmetic packaging. However, its drawback is its weight, which increases transport costs and CO2 emissions.	**Ecological Footprint**: Medium (good for recycling, but high transport costs).
Aluminium Aluminium is a lightweight material that can be recycled repeatedly. However, its primary production is energy-intensive, increasing its carbon footprint.	**Ecological Footprint**: Medium (recycling helps reduce its footprint).
Paper/Cardboard Paper and cardboard packaging are often used as eco-friendly alternatives to plastic. They are biodegradable and recyclable, but paper production involves cutting down trees, which can contribute to deforestation.	**Ecological Footprint**: Low (if sourced from certified sources).

PRODUCTION TECHNOLOGY CARDS

DESCRIPTION	INFORMATION FOR THE TEACHER
Waterless Production Waterless production is a technology used in cosmetics that minimises water usage. It is more sustainable but requires significant technological investments to implement.	**Ecological Footprint**: Low (very eco-friendly).
Traditional Production Traditional cosmetic production often requires large amounts of water and energy. These processes generate a lot of waste and can be energy-intensive.	**Ecological Footprint**: High (negative impact).
Production with Certified Raw Materials (RSPO) Products made with certified raw materials, such as RSPO palm oil, have a lower environmental impact. Certifications ensure that the raw materials are sourced sustainably.	**Ecological Footprint**: Medium.

Low CO2 Emission Production Low CO2 emission production technologies focus on reducing greenhouse gas emissions by optimising production processes, such as using renewable energy.	**Ecological Footprint**: Low (very eco-friendly).
Production Using Recycled Materials Production that uses recycled materials reduces the need for virgin raw materials, limiting the use of natural resources and CO2 emissions. However, energy is required for the recycling process.	**Ecological Footprint**: Medium (a good solution, but dependent on recycling efficiency).
Production Using Renewable Energy Manufacturing facilities that use renewable energy (solar, wind) reduce their carbon footprint and do not emit large amounts of greenhouse gases. However, implementing this technology requires significant investments.	**Ecological Footprint**: Low (very eco-friendly).

PRODUKCJA BEZWODNA

Produkcja bezwodna to technologia stosowana w kosmetykach, która minimalizuje zużycie wody. Jest bardziej zrównoważona, ale jej wprowadzenie wymaga znaczących inwestycji technologicznych.

Card for example