

Target Audience

Vet Trainers

Goal (50-60 words)

The goal of this scenario is to understand the current practices and know ingredients used in the cosmetics and cleaning products industry and to identify potential environmental risks from these activities.

Objectives (1-3 Objectives)

- Knowledge of current practices used in the cosmetics and cleaning products industry.
- Ability to analyse and make conclusions.
- Identification of potential environmental risks.

Optional

Theoretical Background (200-400 words)

Most of us use a variety of cosmetics and cleaning products every day. We wash our hands and dishes, use creams to care for our bodies, wash our dirty clothes and so on. Do we know what is in the detergents and cosmetics we use?

Let's start at the beginning - what do we find in cosmetics?

1. Base substances - this is the base of the cosmetic, e.g. water, alcohol, silicones, emulsifiers, colouring agents. These substances will vary depending on what form our cosmetics are in (aerosol, liquid, powder, emulsion, etc.).
2. Active substances - these are ingredients that have a specific action, such as peptides, free radicals, vitamins and abrasive ingredients.
3. Auxiliary substances - those that allow the product to have the appropriate consistency or durability.

In most cases, the main ingredient is water. Did you know that this water must have a certain purity? Usually it is not enough for it to be drinking water. It has to be additionally tested and purified in order to be used!

What else can we find in cosmetics and cleaning products?

Microplastics are small plastic molecules. Its diameter is less than 5 mm. It is formed as a result of the production of plastic, but also as a result of its decomposition. It is most often added to cosmetics as an abrasive or cleansing substance. It can be found in the formulation under various names: Polyethylene, Polypropylene, Polyamide, Nylon, Polyester, Polyacrylamide, Acrylates Copolymer, Acrylates Crosspolymer, Polyurethane. Because they are so small, they can easily enter water, rivers, seas and oceans, where they endanger aquatic animals.

Silicones are used in hair and skin cosmetics to make hair smooth and shiny. Although they are safe for humans, they are difficult to degrade. Therefore, they accumulate in the environment and can remain there for a long time.

Phosphates are found in cosmetics and cleaning products. They help to maintain the correct pH and act as emulsifiers and stabilisers. Used in redundancy, they can cause skin irritation.

Synthetic preservatives, such as parabens, are used in cosmetics to extend their shelf life by inhibiting bacterial growth. There is growing evidence that they can affect health as they can interfere with hormones in the body.

Phthalates are chemicals used to soften plastics and in cosmetics such as perfumes and deodorants. They help prolong the fragrance and shelf life of products. However, they can permeate the environment and disrupt hormones in humans and animals.

Sulphates (e.g. SLS and SLES) are often used in shampoos, soaps and toothpastes. They are responsible for creating foam, which helps to remove dirt. However, sulphates can irritate the skin and are difficult to remove from water, which has a negative impact on the environment.

Glycols (e.g. propylene glycol, PEG) are chemicals found in many cosmetics and cleaning products. PEGs are used in cosmetics as emulsifiers and solvents. They have a moisturiser and softeners effect. They reduce the water activity in cosmetics so allow oils and water to combine in the product.

Paraffins are petroleum derivatives that are used in lotions, creams and other cosmetics. They give the skin a soft feeling, but because they are of petrochemical origin, they can harm the environment, especially during production and disposal. They are not soluble in water.

Chlorine is used widely in disinfectants and bleach. We usually associate it with drinking water treatment or swimming pools. It kills bacteria and viruses, making it very effective in cleaning and disinfecting. Its excess and insufficiency can harm the health of humans.

In the European Union, there is unified regulation for cosmetics, regulated by Regulation EC No 1223/2009 of the European Parliament and of the Council. Such regulation ensures a uniform standard across all EU countries. Similarly, with regard to cleaning products, the Regulation on Classification, Labelling and Packaging of Chemicals (CLP Regulation) is in force, as well as the Global Harmonised System of Classification and Labelling of Chemicals (GHS).

In cleaning products, the most common substances are:

Solvents - substances that help remove stains and grease, e.g. acetone, alcohol;

Abrasives - which mechanically remove contaminants, e.g. baking soda

Antibacterial or disinfectants - substances that contain bactericidal and virucidal ingredients

Acids and alkalis - help remove deposits, scale and rust

Surfactants - change the surface tension of water, which affects the removal of dirt and makes it easier to dissolve

Dyes - change the colour of the detergent so it can look more attractive

Foaming substances - can make cleaning more effective

Fragrances - give a pleasant fragrance

Preservatives - affect the longevity of the product

Lesson Plan Details	
Lesson Plan title	Cosmetic & Cleaning products industry - Current situation risks
21st Century Skills	Critical Thinking Problem-solving

Duration	<i>Activity 1: 20 minutes</i> <i>Activity 2: 25 minutes</i> <i>Activity 3: 15 minutes</i>
Classroom setting	The class needs to be organised for the lesson in groups.
Required material/resources	<i>Activity 1:</i> • <i>Descriptions of various technologies used in the cosmetics or cleaning products industry and questions to be developed (e.g., use of microplastics in peels, use of chemicals in cleaning products)</i> • <i>Mobile phones or other devices with Internet connect</i> <i>Activity 2:</i> • <i>Paper (A4/A3)</i> • <i>Pens/markers/paints</i> <i>Activity 3:</i> <i>Flipchart</i>
Prerequisites	<i>Knowledge of various technologies used in the cosmetics or cleaning products industry</i>
Final Assessment (if applicable)	QUIZ
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 guide 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)

The following exercises are designed to familiarise students with the ingredients used in the cosmetics and cleaning products industry and their impact on the environment. Each of these exercises can be considered as a sequence of tasks or can be modified and used separately. Conducting these exercises requires the instructor to have a basic knowledge of the ingredients used in the cosmetics and cleaning products and how they affect humans and the environment.

Activity 1: Analyse current situation (20 min)

Divide participants into groups. Prepare or use the attached descriptions and ask students to analyse them in groups. It is important that the descriptions include a brief statement and questions to

facilitate the analysis. The pupils' task is to find the environmental impact of the ingredients used. Provide them with various sources (Internet or books) for this purpose. Suggested descriptions are included, but you can create your own. In this activity, students gain knowledge and the ability to analyse the information they have acquired.

Activity 2: Identify risks (25 min)

The next step is to create a short presentation of the ingredient and present it, e.g. in graphic form (a poster that you will hang in a prominent place in your classroom or school). It is important that the presentations focus on potential environmental risks from using these ingredients, such as microplastic pollution and water consumption.

Activity 3: Discussion (15 min)

Conduct a discussion in the form of a debate by dividing the class into two teams - 'defenders' and 'attackers'. Summarise the key risks and discuss possible solutions. Write them down on a flipchart.

Assessment:

Question 1:

Which of the following substances are often used in facial scrubs and may contribute to ocean pollution?

- a) Microplastics
- b) Parabens
- c) Silicones

Correct answer:

(a) Microplastics - Feedback: Excellent! Microplastics are small plastic particles that end up in water and do not biodegrade, endangering marine organisms.

Wrong answer:

(b) Parabens - Feedback: Parabens are preservatives that may impact the well being of living beings but are not directly connected to pollution in the oceans.

(c) Silicones - Feedback: Silicones are distinct from microplastics; however they can also play a role in contaminating environments with pollution.

Question 2:

Why are phosphates used in cleaning products bad for humans?

- a) They cause algae growth
- b) They increase the amount of bacteria in water
- c) They can cause skin irritations

Correct answer:

(c) They can cause skin irritations - Feedback: Good! Phosphates used in excess can irritate the skin.

Wrong answer:

(a) They cause algae growth - Feedback: Phosphates have an impact on algae growth. Their relevance to cosmetics use is negligible.

(b) They increase the amount of bacteria in water - Feedback: They contribute to the rise in algae levels in water. Note ; Phosphates primarily impact the growth of algae, than bacteria.

Question 3:

What potential environmental risk may result from the using of silicones, in beauty products?

- a) Silicones are highly toxic to plants
- b) Silicones accumulate in the aquatic environment and are not biodegradable
- c) Silicones cause a rapid spread of bacteria in waters

Correct answer:

(b) Silicones accumulate in the aquatic environment and are not biodegradable - Feedback: Good! Silicones do not easily break down in the environment. Tend to build up in ecosystems where they can impact the organisms residing there.

Wrong answer:

(a) Silicones are highly toxic to plants - Feedback: Silicones do not pose a threat to plants as they are not considered toxic to them in any way.

(c) Silicones cause a rapid spread of bacteria in waters - Feedback: Silicones do not affect bacterial growth.

Question 4:

What can phthalates do?

- a) Hormonal disruption in living organisms
- b) A reduction in the pH of seawaters
- c) An increase in water hardness

Correct answer:

a) Endocrine disruption in living organisms - Feedback: Great! Phthalates can affect the endocrine system in humans and animals.

Wrong answer:

(b) A reduction in the pH of seawaters - Feedback: Phthalates do not affect the pH of seawater.

(c) An increase in water hardness - Feedback: Phthalates have no effect on water hardness.

Attachment (an attachment to Activity 1) – ingredients descriptions:

Sulphates (e.g. SLS and SLES) are often used in shampoos, soaps and toothpastes. They are responsible for creating foam, which helps to remove dirt.

What happens to them after rinsing?

What effect do they have on organisms living in the water?

Glycols (e.g. propylene glycol, PEG) are chemicals found in many cosmetics and cleaning products. PEGs are used in cosmetics as emulsifiers and solvents. They have a moisturiser and softeners effect. They reduce the water activity in cosmetics so allow oils and water to combine in the product and .

What are the risks of their use?

What are the effects of their production?

How do they affect humans and what happens to them in water?

Paraffins are petroleum derivatives that are used in lotions, creams and other cosmetics. They give the skin a soft feeling.

What are the risks of petroleum extraction and processing?

Phthalates are chemicals used to soften plastics and in cosmetics such as perfumes and deodorants. They help prolong the fragrance and shelf life of products.

What negative effects do phthalates have?

What could be more environmentally friendly ways of creating fragrances?

Phosphates are found in cosmetics and cleaning products. They help to maintain the correct pH and act as emulsifiers and stabilisers.

What happens when there are too many of them in the water?

What could be better substitutes for phosphates?

Parabens in cosmetics and cleaning products:

Parabens are preservatives that prolong the life of cosmetics such as creams and shampoos.

What negative effects do they have?

How can their negative effects be reduced?

Microplastics are small plastic particles added to cosmetics to act as an abrasive.

How can their environmental impact be reduced?

What other materials can replace them?

Silicones such as dimethicone, are added to cosmetics to give smoothness and shine.

What negative effects do they have on the environment?

Chlorine is used to kill bacteria and bleach fabrics.

What are the risks of its use?