



Co-funded by the  
Creative Europe Programme  
of the European Union

Project 2020-1-TR01- KA201-094533



The Key To Global Life,  
Digital Change Of Nature



**Total Duration:** 3 hours



**Student's Age:** 12-18 Years



**Application Area:**

- Materials,
- environmental pollution,
- gain awareness,
- microplastics.



**Keywords:** Microplastics,  
pollution, microscopy.



## E4 - Learn about Microplastics!



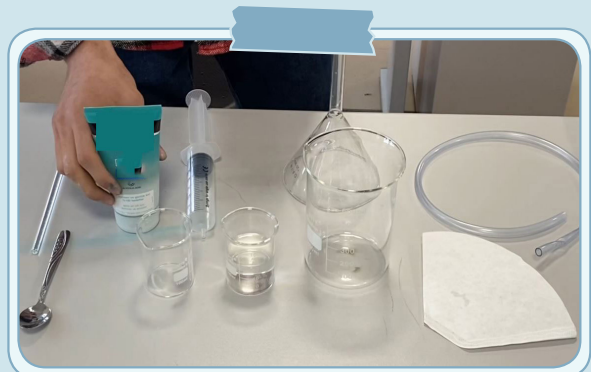
### Module

- Environmental pollution
- Global Warming

**E4 - English Version**

### Materials:

- 3 coffee filters
- 1 funnel
- 1 x 100 ml syringe
- 30 cm vinyl tube (be careful about it's sized to fit through the funnel opening)
- 1 x 30 ml glass cup
- Peeling cleaning product (toothpaste, face cleaner, etc.)
- 30 ml of water
- Microscope
- Microscope slides
- Clear plastic tape



### Notes:

In this activity, each group will be able to:

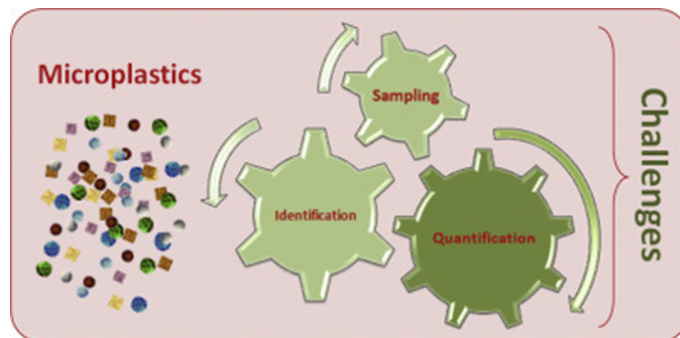
- Have basic knowledge in order to prepare infographic material
- Willingness to obtain microplastic wastes from any product
- Prepare a presentation of the results obtained
- Design an awareness label



@digitalchangeon

## Summary

Students learn about microplastics and the consequences of microplastic buildup in nature. Then they make their own microscope slides using tape to collect some fibers from their own clothes, then fix it to a microscope slide and examine it. Afterwards, they can discuss some actions they can take to minimize the amount of microplastics that end up in nature and talk about what they learned (Picture 1).



Picture 1. Microplastics

## Introduction

This activity intends to help students to recognize the damage caused by microplastics in nature and develop the need to raise awareness in society. The activity consists of 3 steps. The first step is to watch a variety of videos for informational purposes and to observe fibers under the microscope according to the type of their clothing (elastane, cotton, linen, etc.). The second step is to demonstrate that even personal care products release microplastics into nature and finally to set up a device that proves it. The last step is to prepare flyers and labels to gain awareness (Picture 2).



Picture 2. Learn about Microplastics

## Considerations

In this activity, each group will be able to:

- Have basic knowledge in order to prepare infographic material
- Willingness to obtain microplastic wastes from any product
- Prepare a presentation of the results obtained
- Design an awareness label

## Aims of the activity

The purpose of this activity is to ensure that students are enable:

- To observe and recognize microplastics in nature and be aware of the damage caused by their accumulation and to work for public awareness.
- To enable them to gain the ability in using computing and digital tools and web 2.0 applications during the activity.
- To enable them to read labels on personal products
- To understand the importance of buying cotton or linen instead of elastane polyester, nylon, viscose
- To recognize the importance of buying metal or glass containers instead of plastic.

## Activity Process

## Before Activity

- At this stage, students pair up in groups of 2-4 per microscope. There is an application that can be used to randomly perform these groups (Picture 3).

<https://www.classtools.net/random-name-picker/>



Picture 3. Chose the groups

- Create logos of the groups (Picture 4)
- When groups are complete, the concept of microplastics is introduced to the students



Picture 4. Create the logos

- Students will discuss about the dangers of the accumulation of microplastics in nature (Picture 5).
- Students can also benefit from visuals at this stage and watch videos

<https://www.youtube.com/watch?v=KpVpJsDjWj8>



Picture 5. Discuss about Mictoplastics

## Let's Start

### 1 Search with Microscope

Check the labels of their clothing and observe with a microscope which material it is:

For this step, the students will become familiar with the microscope technique and will be able to check the contents of the various clothes (cotton, linen, bamboo: Organic fibers, polyester, artificial silk, viscose, acrylic, PET, elastane, etc.: polymer (plastic) fibers (Picture 6).



Picture 6. Search with Microscope

They should make a range of microscope slides, by using clear tape to stick on their shirts and take "samples". By sticking this tape to a slide, the students can observe microplastics and how they are different to cotton fibers or human hair etc.

The fibers are examined under the microscope. At this stage, students take pictures of the microplastics under the microscope by putting their phone camera to the eyepiece and can compare materials for example polyester vs cotton (Picture 7).



Picture 6. Search with Microscope



Picture 7. Search with Microscope

1. Watch the video at this link <https://www.youtube.com/watch?v=7UaQAh6S7kA>

2. Put some personal cleaning material on the spoon. (this product should have a granular structure with peeling effect. Products containing polyethylene release a huge amount of microplastics. This activity allows students to gain the ability to read labels

3. Place the coffee filter in a funnel to evidence microplastics that the product contains (Picture 8).



Picture 8. Place the funnel



Picture 9. Coffee filter

## 2 Amount of plastics

Observe the amount of microplastic waste in personal cleaning products:

At this stage, students detect a certain amount of microplastic wastes from a personal cleaning product, drawing attention to the size of microplastic waste that are very small plastic pieces are usually between 3-8mm in diameter (Picture 7).

4. Collect and weigh some product in the spoon and mix with water until the mixture is homogeneous. The resulting mixture is drawn into a 100 mL syringe.

5. At the tip of the syringe is placed a vinyl tube with a diameter of 30 cm that can pass through the funnel. The other end of the vinyl tube is placed in the funnel with the coffee filter (Picture 9).

6. The entire content of the syringe is gradually discarded and expected to be filtered .

7. When the remaining particles in the coffee filter are completely dry, weight them (Picture 10). The value obtained is proportional to the entire box of microplastics that is derived from the sample taken.

8. The student will be able to determine the amount of microplastic wastes left in nature by a box of personal cleaning products.



Picture 10. Coffee filter



### 3 Presentation

To show to the community the information they have learned about microplastics and the consequences of plastic pollution in our daily life they will design a sticker that will raise awareness to the community in reducing plastic use (Picture 11).

Trust the student's imagination at this stage. Groups can prepare infographics using the web.2.0 tool (you can recommend which applications they can use)

- <https://www.canva.com/>
- <https://templates.office.com/tr-tr/templates-for-word>
- or by drawing their own presentations.

A group can also prepare a PowerPoint presentation for this purpose showing an example. (What's in your Deodorant? click on presentation)

- <https://flseagrant.ifas.ufl.edu/microplastics/multimedia-and-outreach/>



Picture 11. Presentation

Closure



- Ask them to design labels after the infographic stage. You can print and show a large number of examples and distribute them to local restaurants (Picture 12).



Picture 12. Examples

Assesment

Evaluation

- The design of students can be displayed within the school. Different products can be created by diversifying waste materials used.

| Goals   | Must be Improved<br>(1) | Medium<br>(2) | Good<br>(3) | Very Good<br>(4) |
|---|-------------------------|---------------|-------------|------------------|
| Task organization, teamwork, effective communication during the activity of the group work. | (.....)                 | (.....)       | (.....)     | (.....)          |
| The process of designing an experiment  | (.....)                 | (.....)       | (.....)     | (.....)          |
| Label design  | (.....)                 | (.....)       | (.....)     | (.....)          |
| Infographic design  | (.....)                 | (.....)       | (.....)     | (.....)          |
| The ability in using digital tools during the activity                                      | (.....)                 | (.....)       | (.....)     | (.....)          |
| Communication ability in tag distribution   | (.....)                 | (.....)       | (.....)     | (.....)          |
| Presentation ability  | (.....)                 | (.....)       | (.....)     | (.....)          |
| Total   |                         |               |             |                  |

**Links**

<https://redesign.global/>

Lesson: Plastic migration and its impact: <https://www.teachengineering.org/lessons/view/uok-2116-plastisphere-microplastics-pollution-wastewater-treatment>

Course and applied activity: Microplastic Extrude of Exfoliating beads from cleaners <https://www.teachengineering.org/activities/view/uok-2216-microplastic-extraction-cleanser-beads-filter-design>

Course and Practical Activity: Monitoring Fluorescent PTire in water environment: <https://www.teachengineering.org/activities/view/uok-2216-tracing-fluorescent-plastics-aquatic-environment>

From the book: Challenges and Treatment of Microplastics in Water

From a scientific article: Advances and challenges of microplastic pollution in freshwater ecosystems: a UK perspective.