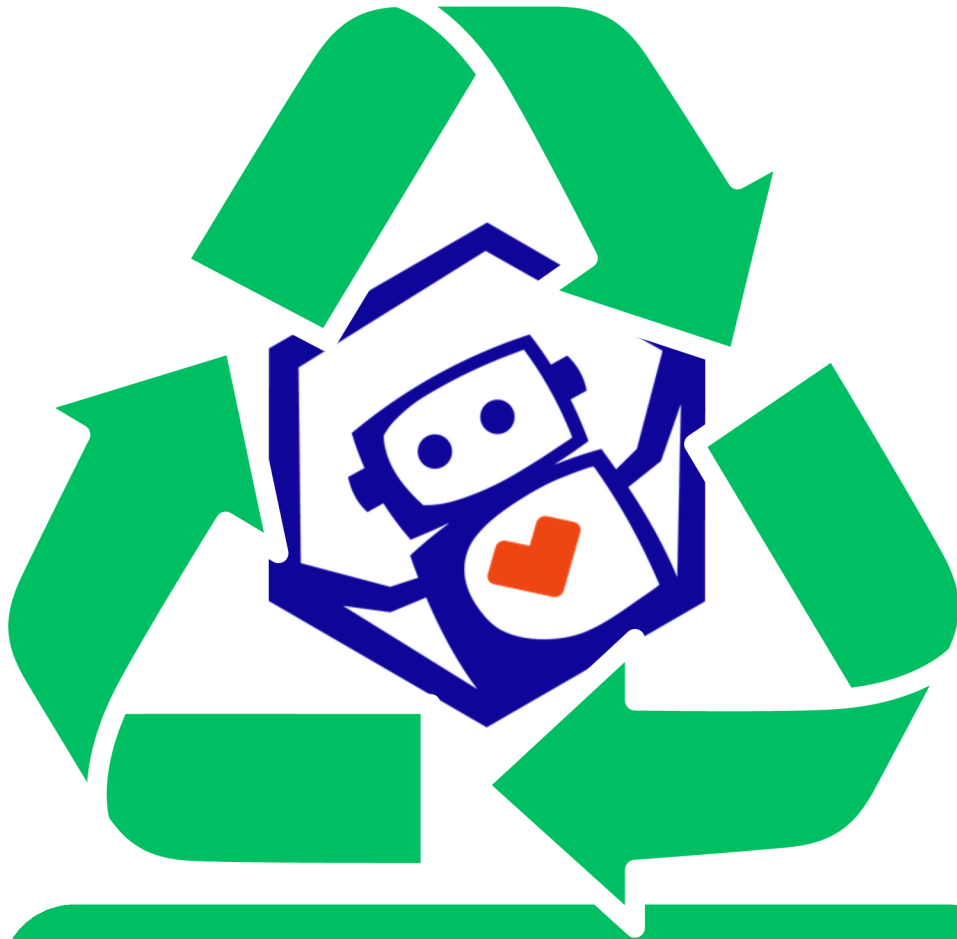


EU FOR ALL

Using Sustainable Entrepreneurship to Repurpose Europe's Heritage for All





**STEP BY STEP
GUIDE ON HOW
TO CREATE
SUSTAINABLE
BUSINESS**



The resources of the EU FOR ALL project, including the materials kit, 3D models, and educational proposals, are undergoing continuous improvement. We are constantly working to incorporate new ideas, adjustments, and contributions from the participating teams. Therefore, both the documents and files may be reviewed and updated over time.

www.euforall3dproject.com

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PARTNERS:



1. Warm-up Phase – Towards a Sustainable World

- Basics of sustainability
- Introduction to the 17 SDGs
- Plastic waste in our environment

2. Research Phase – PET Recycling

- Research on plastics and PET
- Good practices in recycling
- PET bottle → filament process
- How the filament-making machine works

3. Creative Phase – Product Ideation

- Product ideas made from recycled filament
- Problem–solution connections
- Links to the SDGs
- Comparing product ideas
- Decision-making methods
- Detailing the selected product

4. Design Phase – 3D Modelling & Prototyping

- Introduction to 3D design
- Creating a digital model
- Printing prototype and testing

5. AI Integration Phase

- The role of AI in design and development
- Creating a mockup with AI
- Usage instructions and further development ideas

6. Presentation Phase – Pitch

- Structure of a pitch
- Presenting the product and prototype

7. Evaluation & Reflection

- Peer assessment
- Self-assessment
- Final project reflection

📌 Sustainability goals - 17 Goals to Transform Our World



SDG - Sustainable Development Goals - a development area defined by the United Nations. "The Sustainable Development Goals are a call for action by all countries – poor, rich and middle-income – to promote prosperity while protecting the planet."

SUSTAINABLE DEVELOPMENT GOALS



🔍 Explore the SDGs!



For more info about the SDGs, follow the QR code!



Q Collect the SDG-s that are related to waste, circular economy and responsible production! 

Choose these sustainability goals, explain briefly how it connects to the topic and find examples of it in your environment!

Number and short name of the SDG	Explanaion	Can you recognize an example in your environment?

Q Plastic waste, PET bottles in your daily life 

Make a short, few seconds long video

a) about what kind of plastic waste you produce

b) about what you use empty PET bottles for

Copy here the URL of your video!



1

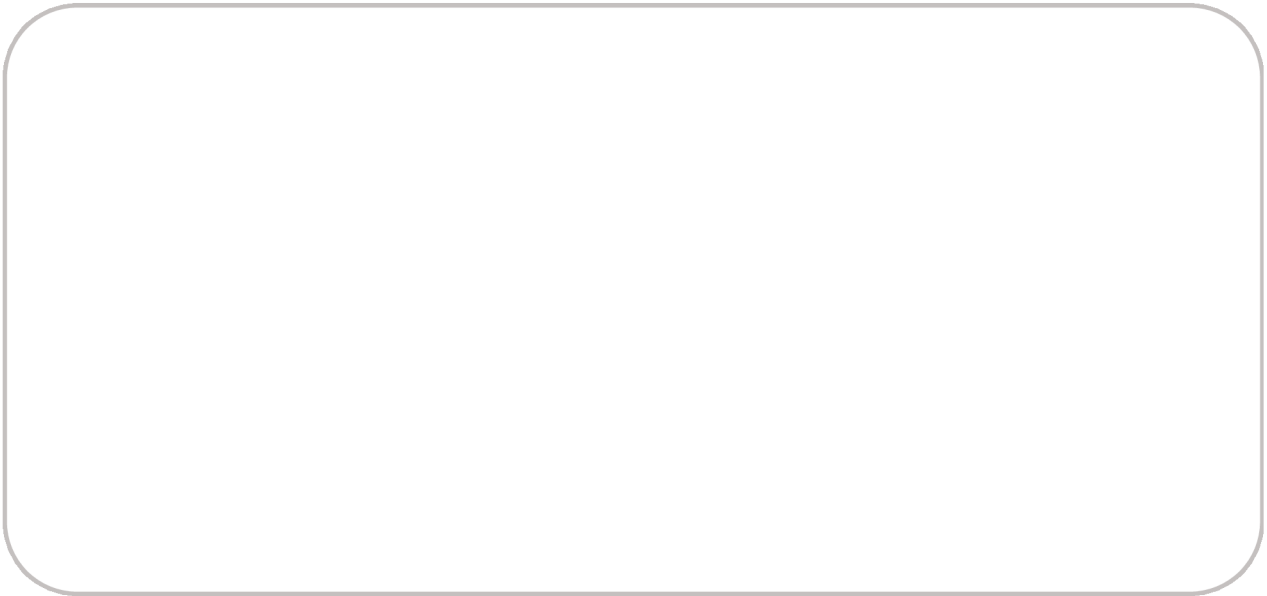
Warm-up! Towards a Sustainable World


Find the connection between plastic waste and the SDGs!

Make a wordcloud of as many possibilities as you can about how we use plastic and how it appears in our lives.

You have 2 minutes to work, so don't stop writing!


You can use <https://wordart.com/> !



 Create the same word cloud, replacing the words with the SDG numbers most closely related to them! Use the official SDG colors to color the numbers (e.g., based on the image in the Warm-up phase)!

Which SDGs appear most often?

Develop this word cloud further so that the size of the numbers indicates the frequency of the SDGs.



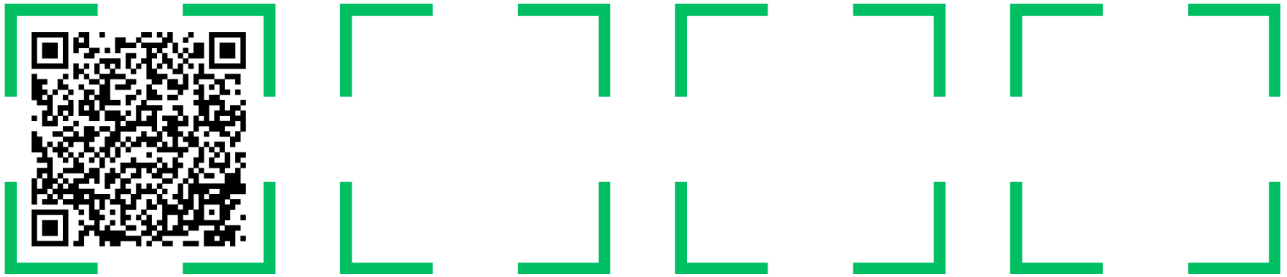
Collect as much data as possible about plastic waste!

Search for information online about plastic waste!

You can focus on changes over time, the origin of waste (household, industrial, etc.), its geographical or other spatial location, but you can also come up with other aspects.

This URL can be a good starting point.

Create QR codes for easy access to the sites from which you have gathered information.



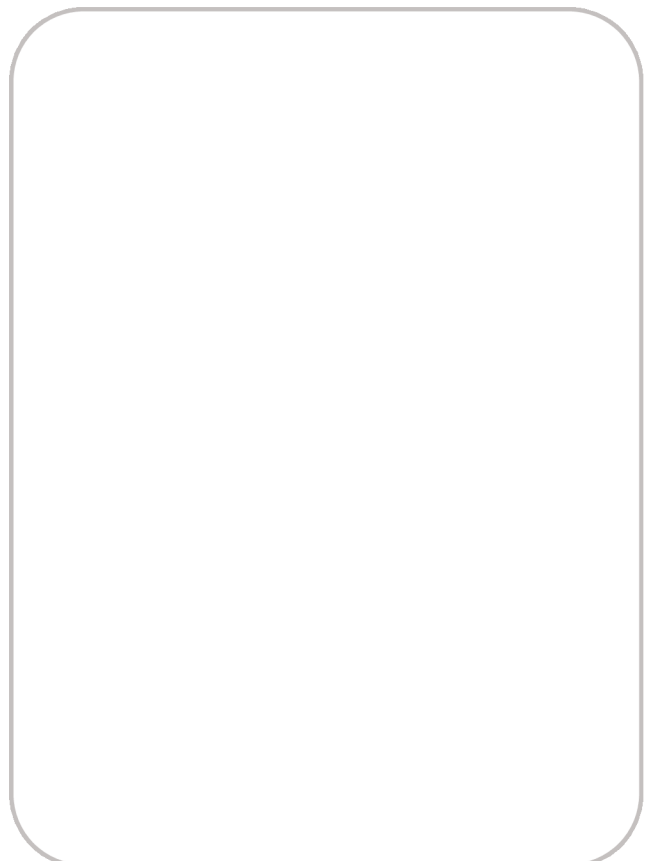
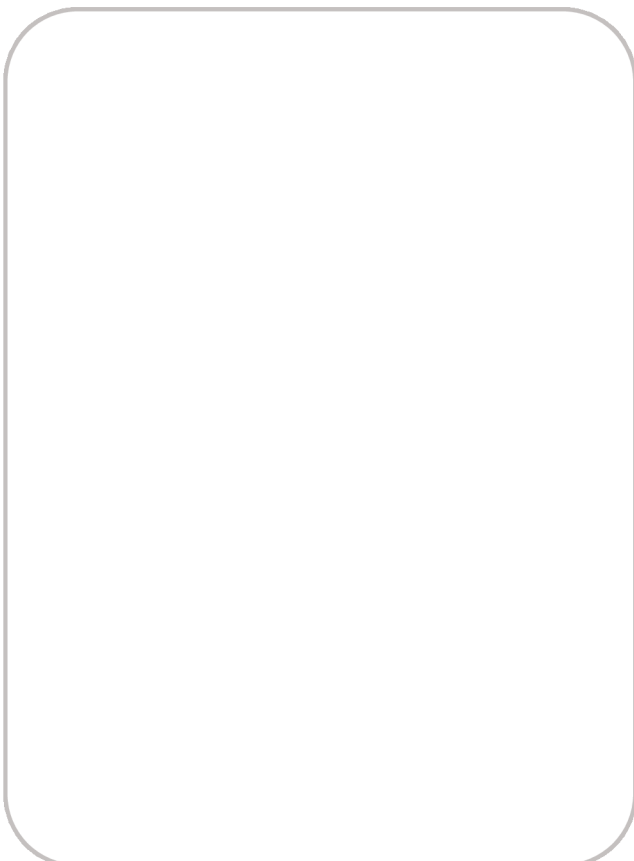
Make diagrams and infographics from the data!



Use a spreadsheet program to create the chart!

Create the infographic in Canva or another presentation program!

Create the infographic using AI as well, and compare the two!



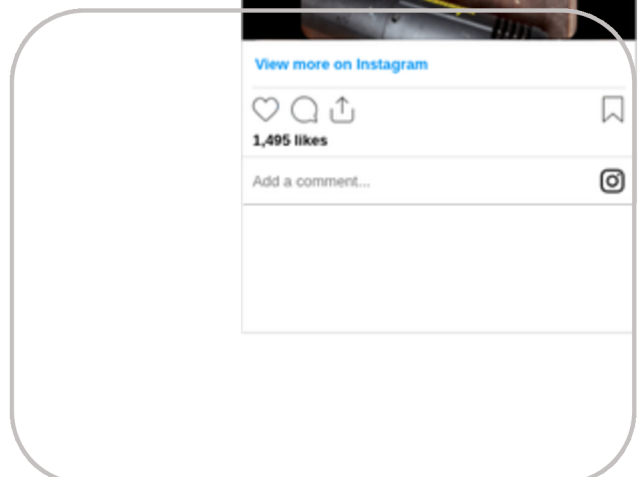
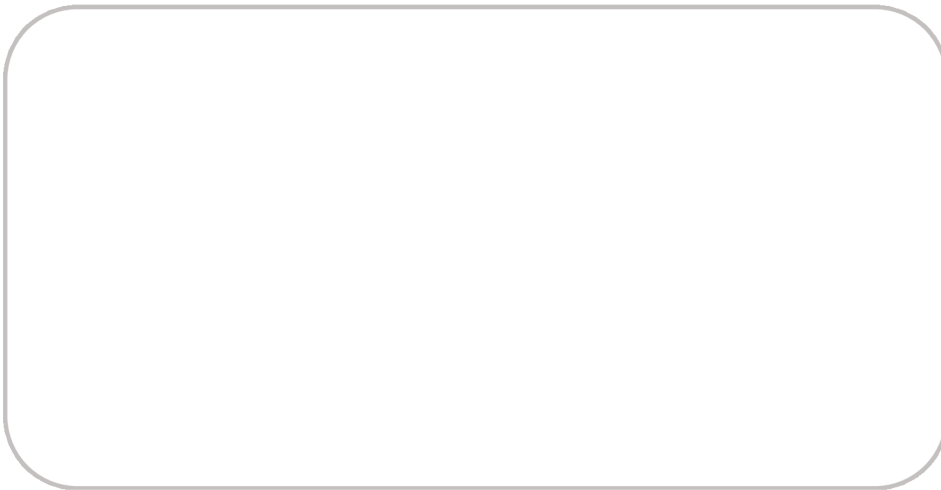
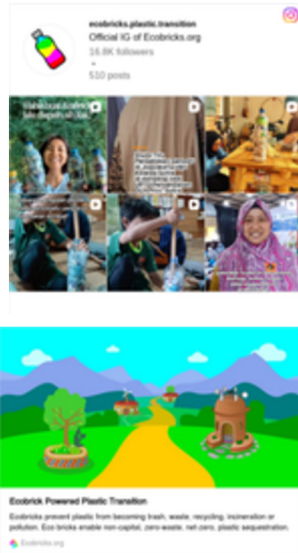
2 Research Phase: How to give plastic waste a new life?

🔍 **How can we transform waste into new materials?**



Visit the links below and discover ideas for recycling plastic!

What is the basic idea? What effect does it have? What technology is needed to achieve it?

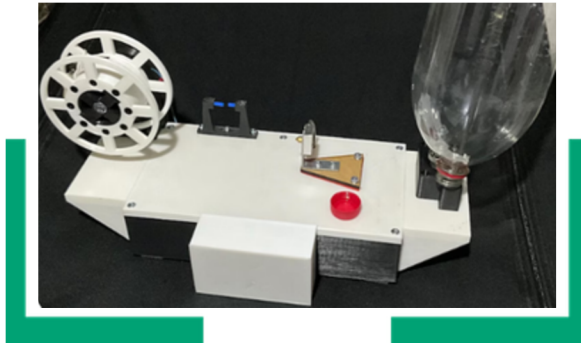


2 Research Phase: How to give plastic waste a new life?

New objects made from PET bottles



Among the solutions for recycling PET bottles, there are devices that produce filament for 3D printing from PET bottles.



Let's see how this machine works! Follow the QR code!



How are PET bottles turned into 3D printing filament?



- 1) Sort and clean the PET bottles, and remove labels and caps
- 2) Cut bottles into continuous strips (5–8 mm wide) with a bottle-strip cutter or scissors. Keep strip widths consistent so they pull evenly through the die.
- 3) Heat the die: Power the unit and preheat. For PET, typical melt temps are ~245–260 °C. Start lower and increase gradually until the strip feeds smoothly without burning.
- 4) Guide the strip into the heated inlet; use the machine's feed path to draw it through the heated die. Maintain steady tension on the exiting filament. (Pull too fast → thin filament; too slow → thick filament.)
- 5) Cool and gauge diameter: Run the hot strand through a fan or water bath to set its shape.
- 6) Spool the filament: Guide the cooled strand onto a spool winder (motorized if possible).



2 Research Phase: How to give plastic waste a new life?

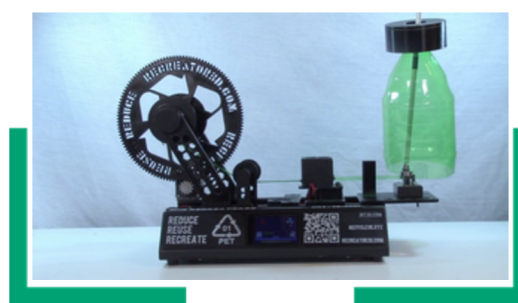
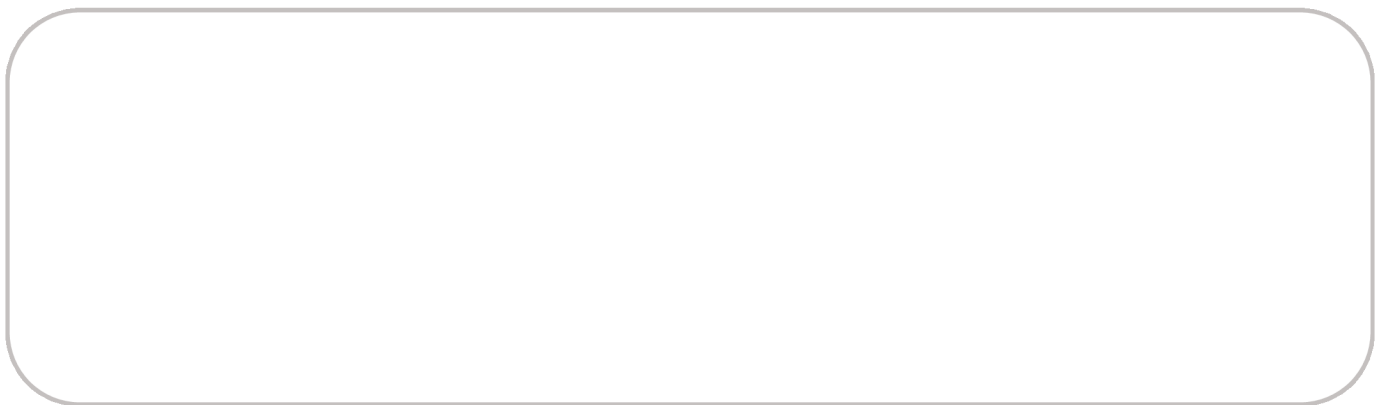
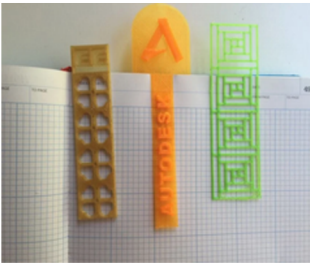


What Can We Create With Our Recycled Filament?



Our recycled filament is ready – what can we use it for?

The following images show a few ideas on how 3D printed objects can make our lives easier, more comfortable, and more practical. Click on the picture to navigate to its website! Which ones do you like best? Why?



3

Creative Phase: Let's Find Out a New Product!



Let's create a new product!



Come up with ideas!

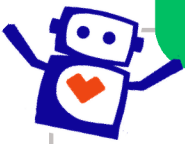
Come up with 3 products that can be made from recycled PET bottles using 3D printing!

List your ideas in the table below! Also write what problem, need, what your product solves!

Use AI to create an image showing the suggested object in use!

Product idea No.: 1

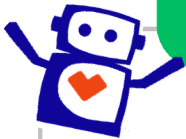
What is it and how to use it?



**What problem/need does it solve?
Which SDG is it linked to and how?**



Image of the product idea



3

Creative Phase: Let's Find Out a New Product!



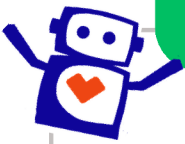
Let's create a new product!



Come up with ideas!
Come up with 3 products that can be made from recycled PET bottles using 3D printing!
List your ideas in the table below! Also write what problem, need, what your product solves!
Use AI to create an image showing the suggested object in use!

Product idea No.: 2

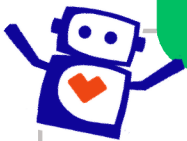
What is it and how to use it?



**What problem/need does it solve?
Which SDG is it linked to and how?**



Image of the product idea



3

Creative Phase: Let's Find Out a New Product!



Let's create a new product!



Come up with ideas!

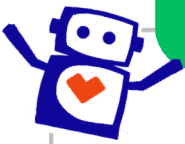
Come up with 3 products that can be made from recycled PET bottles using 3D printing!

List your ideas in the table below! Also write what problem, need, what your product solves!

Use AI to create an image showing the suggested object in use!

Product idea No.: 3

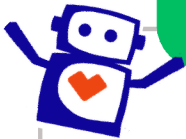
What is it and how to use it?



**What problem/need does it solve?
Which SDG is it linked to and how?**



Image of the product idea



3

Creative Phase: Let's Find Out a New Product!



Decision



Discuss the three product ideas, argue your points, convince each other, and finally decide together which one you will implement!

How did you decide?

- By consensus (we reached a unanimous opinion)
- By vote (the majority decided)
- One of us decided the debate
- We couldn't reach a decision



Let's examine the product ideas thoroughly!



Detailed plan for the product:

What exactly can it be used for, and how?

Can it be made with the tools you have available? (PET bottle to filament converter, 3D printer, computer)

Make a rough sketch of the design, including the dimensions!

Sustainability considerations:

How important is the problem that your solution addresses? How many people does it affect?

How does it promote sustainable development in your environment and how?

Summarize which SDGs your product brings closer to achieving. How?

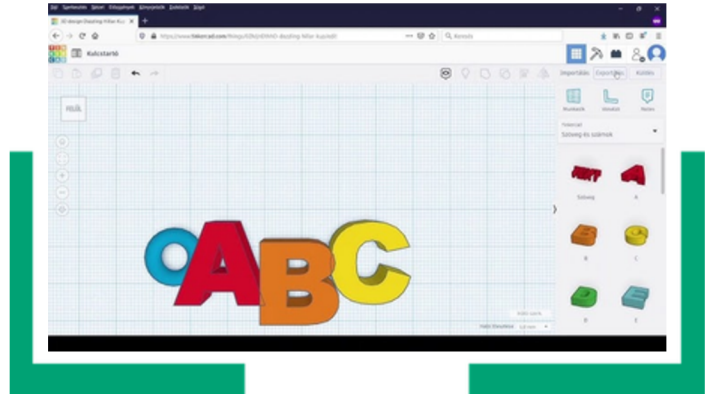


4 Design Phase: Prototyping

🔍 Get to know the Tinkercad program!

In order to create your own 3D printed products using filament made from PET bottles, you first need to be familiar with a 3D design program. Watch the video linked to the QR code below and follow the step-by-step instructions to learn how to use Tinkercad!

For tutorial video,
follow this QR code!



🌟 Design your product!

Design your product in TinkerCad!
Download the print file for printing!
Paste your design image here!



Design Phase: Prototyping

🔍 Sustainable 3D printing - How is filament made from PET bottles?

Recall what you learned earlier about PET bottle filament transformation!
Create a flowchart of the steps in the process! Illustrate each phase with pictures!
Indicate what you need to pay special attention to in each step!

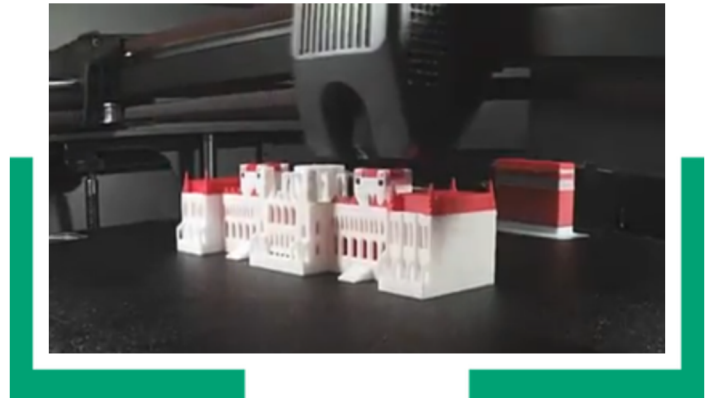


4 Design Phase: Prototyping

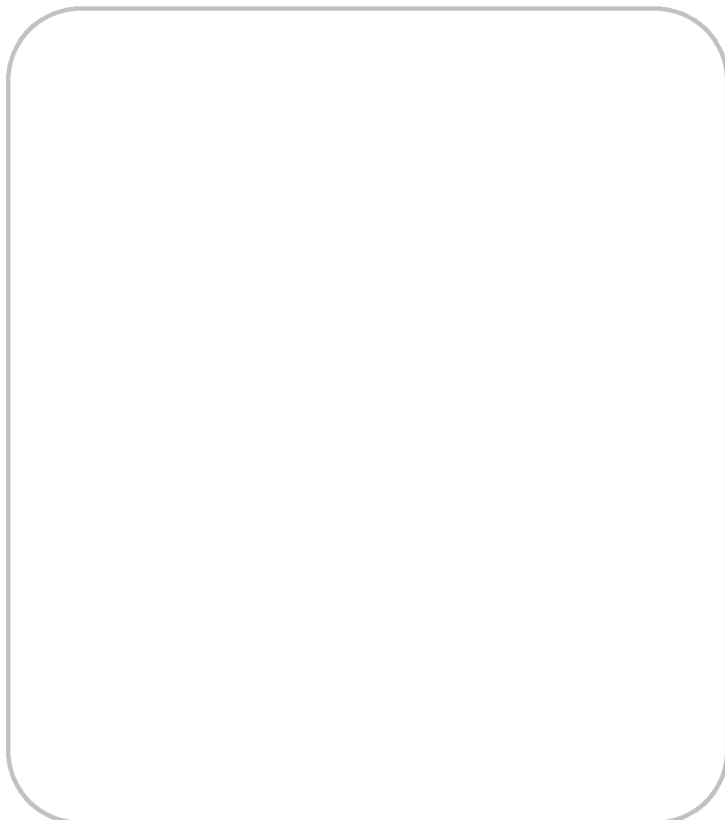
🔍 Getting ready to print

Watch the video linked to the QR code below and follow the step-by-step instructions to recycle PET bottle to filament and to use the 3D printer!

For tutorial video,
follow this QR code!



Print your designed product with a 3D printer!
Make a note of the main printing parameters in the table!
Take a photo of the finished product and insert it into the frame!



Layer height	_____ mm
Speed	_____ mm/s
Temperature	_____ °C
Infill	_____ %



4 Design Phase: Prototyping



Testing the prototype

Examine and test the prototype!

Use the checklist below to evaluate whether it is satisfactory or where it needs improvement!

Based on the test results, refine the idea/3D design if necessary!

Criteria	Compliant	Where to improve
Usability		
Durability		
Size		
Safety		
Appearance		
Relevance to the selected SDG		



Rate of recycling

Calculate how many PET bottles you used to make the prototype!



5

AI Integration Phase

After successfully creating the prototype, now use AI to make the idea even more usable!



User manual

Use AI to create an illustrated user manual for your product!



5

AI Integration Phase



Use AI to generate visual mockup of your product!

A mockup is an image or visualization that shows how an idea will look and function before it is actually created. For example, it depicts the prototype in its real environment or in operation.

A large, empty rounded rectangle with a thin grey border, intended for a visual mockup of a product.

Refine object design!

Use AI to develop improved ideas for your products! (Think ergonomics, functionality, usability.)

A large, empty rounded rectangle with a thin grey border, intended for refined object design.

6 Presentation Phase: Prototype Presentation

🗨️ Pitch or elevator speech

A pitch or elevator speech is a short, persuasive presentation in which the speaker presents an idea, product, service in a few minutes. Due to the time constraints and the need to capture the audience's attention, the pitch must be direct and assertive.

It greatly enhances the effectiveness of your pitch if you back it up with a visually appealing, concise presentation.



Prepare a 5-minute pitch to introduce your product!

It is useful to include the following in your presentations!

- Product name and purpose
- A question, example, story, graphic that grabs the audience's attention and directs them to your main point.
- The sustainability problem (SDG) your product offers an answer to
- Describe your solution idea
- Explain the importance and usefulness of PET bottle recycling
- Describe the journey of PET bottles being transferred to filament
- Demonstrate how the machine that makes filament from PET bottles works
- Present the 3D digital model and the finished prototype
- Outline opportunities for further development
- Make room for questions!



7 Evaluation and Self-Assessment Phase



Peer feedback on prototypes and presentations

Based on the information obtained from the pitches, evaluate the products using the following criteria!

Product name:

Total score:

Evaluation criteria	Score		
The pitch presented the product in a concise, purposeful, and attention-grabbing manner within the available time.	3	2	1
The sustainability problem that the product offers a solution to is important.	3	2	1
The solution, product answers to the problem	3	2	1
The idea is explained clearly, creatively, and in a way that everyone can understand.	3	2	1
The team shows a good understanding of why PET recycling matters for the environment and society.	3	2	1
The steps of PET bottles being transferred to filament are presented in a logical, easy-to-follow way.	3	2	1
The representation of the product is clear and engaging, showing the strong connection to sustainability goals	3	2	1
The digital 3D model and prototype are well presented, and their connection to the original idea is clear.	3	2	1
The team suggests realistic and creative ideas for improving or expanding the project in the future.	3	2	1



7 Evaluation and Self-Assessment Phase



Reflect on the work of your group and your product!

Team work

How engaged were you with the challenge? 5 4 3 2 1

How good was the cooperation among the members of the group? 5 4 3 2 1

How well did you manage to distribute the work among yourselves? 5 4 3 2 1

Creativity

How original was the group's idea regarding recycled product? 5 4 3 2 1

How creatively did the group use the information you collected? 5 4 3 2 1

How creatively did the group come up with the new product? 5 4 3 2 1

Sustainability awareness

To what extent did the product idea exploit the potential of filament produced from PET waste? 5 4 3 2 1

To what extent have you managed to capture a real sustainability problem? 5 4 3 2 1

To what extent is the product idea linked to the SDGs? 5 4 3 2 1



7 Evaluation and Self-Assessment Phase



Evaluation of the group's work

Digital solutions

How varied was the group's use of digital tools?

5 4 3 2 1

How effectively did you use digital tools?

5 4 3 2 1

To what extent have you developed your skills in using digital tools?

5 4 3 2 1

How well were you able to realize your ideas in TinkerCAD?

5 4 3 2 1

How much did the use of AI help your work?

5 4 3 2 1



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These materials aim to provide accessible and engaging learning experiences that foster key competencies in digital skills, problem-solving, and critical thinking. Through interactive and hands-on approaches, the project seeks to empower learners of all backgrounds by equipping them with the necessary tools to navigate an increasingly digital world.

Developed in collaboration with experts in education, technology, and inclusion, these resources reflect the commitment of the EU FOR ALL consortium to innovation in education and the reduction of the digital divide.

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