

## Lesson Plan: The Way of Waste Italy

<b>Subjects</b>	English, Italian, Maths, Physics, Biology, Philosophy/Social Sciences, Citizenship	
<b>Title</b>	The Way of Waste	
<b>Target group</b>	Third Form pupils ( 16-17 yr old): three classes ( around 70 students).	
<b>Lessons</b>	18 hours	
<b>Learning Objectives</b>	<ol style="list-style-type: none"> <li><b>Critical Thinking.</b> Definition/presentation of a complex real problem to stimulate the students' learning and critical thinking skills and help them be able to make suggestions to solve the problem. In addition to the subject contents (concepts, theories, specific vocabulary), <b>PBL methodology</b> promotes <b>team working</b> and <b>communication skills</b></li> <li>Competent <b>active citizenship</b>: develop students' awareness, individual and collective contribution to development and change in a global perspective.</li> </ol>	
<b>Learning Outcomes</b>	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>- apply and combine knowledge of sociology, economics and politics to explain current challenges in our society</li> <li>- examine current national political decisions, considering the role of the EU</li> <li>- analyze problems and selecting priority issues with regards to waste and waste management</li> <li>- select information from authoritative sources (academic works/articles) to discuss about a problem concerning nowadays society <ul style="list-style-type: none"> <li>- understand why it is important to reduce waste and how to contribute concretely to reduce the impact of waste changing one's own habits in everyday life</li> </ul> </li> <li>- investigate the interaction between technological development and the social development (science + technology)</li> <li>- suggest possible solutions</li> </ul>	
<b>Phases</b>	<b>Lesson Activities</b>	<b>Timing</b>
1. Preparatory	<p><b>INTRODUCTION</b></p> <p>The students are faced with questions to introduce the topic (challenge):</p> <ul style="list-style-type: none"> <li>• What does the problem of waste mainly consist of?</li> </ul>	1hr

- What kind of impact does the problem of waste have on our society?
- What can we do to tackle the problem of waste?
- In your opinion, is it a municipal, regional, national , European or worldwide problem?

### USEFUL LINKS TO INTRODUCE AND UNDERSTAND THE PROBLEM

#### Strategic framework EU 2022-24

<https://zerowasteurope.eu/library/zero-waste-europe-strategic-framework-2022-24/>

#### Waste-to-energy plants

<https://www.nationalgeographic.it/ambiente/2020/07/trasformare-i-rifiuti-di-plastica-in-energia-e-una-buona-idea>

#### Preparatory phase/introductory activities (each class, separately). Presentation of Erasmus+ project and PBL approach

- **Philosophy/ Social Sciences.**

**Sociology** textbook and documents provided by the philosophy teacher: chapters/articles about ecology, sustainability and environmental education:

*“One of the questions I am frequently asked when I am speaking in various countries is, given the environmental problems that the world is facing, can we make it? That is, can we avoid economic decline and civilizational collapse? My answer is always the same: it depends on you and me, on what you and I do to reverse these trends. It means becoming politically active. Saving our civilization is not a spectator sport. “*  
Lester Brown

<https://docs.google.com/document/d/1qSmDxeexah9e7bp41i2WiTeEhXalvavGZO1ztncfzu8/edit>

Activity: brain storming, individual reading and class discussion (in Italian and English).

2hrs

<https://www.orizzontescuola.it/raccolta-differenziata-dei-rifiuti-a-scuola-un-esempio-di-regolamento/>

2hrs

- **Maths/Physics**

**Activities during the actual lesson:**

Start by explaining that the lesson plan is part of an Erasmus+ project and is based on the problem-based learning approach.

Theoretical explanation accompanied by practical examples of Archimedes' Principle and the resulting phenomenon of buoyancy of objects.

Visualization and application of the theoretical concept to a concrete problem: the buoyancy of plastic.

A question is posed to the class: What happens when plastic is dispersed in water?

Guided analysis of the question through:

- Video “Un Mare di Plastica” (tr.A Sea of Plastic,), source: Mi Manda Rai Tre Episode from 06/05/2022 [Link](#)
- In-depth document “Un Mare di Plastica” (A Sea of Plastic): global production of plastic, plastic after use, from rivers to the sea, life in the sea plastic, estimated composition of waste in the sea [Link](#)

The problem of plastic pollution, class discussion on the following topics: excessive production, very short use, inadequate management, insufficient secondary markets.

The following questions are posed to the class:

- Where does plastic end up?
- How likely is it to reach the ocean?
- Analysis of the questions using the Plastic Tracker tool: [Link](#)
- Reflection on a concrete problem: plastic bottles, large or small?

Quantitative analysis of Archimedes' Principle:

- Calculation of Archimedes' thrust;
- Conditions for buoyancy and reflection on the problem of microplastics.

Mathematical analysis of the plastic production graph:

- Relationship that links the observed quantities;
- Reflection on a possible predictive model to estimate future production volumes.
- **Tabulation of data** related to three different bottle sizes (0.5 L, 1.5 L, 2 L): the mass of a single bottle and the amount of plastic used to bottle 300 L of water.

Returning to the problem of plastic bottle sizes, the following questions are posed to the class:

- What is the most ecological bottle size and why?
- What is the percentage decrease in plastic consumption for the most ecological format compared to each of the other two formats?
- Homework: **Write a reflection** on what you observed, specifying what contribution each of us could make to solve the problem of plastic waste.

- **Italian/Biology and English**

**Multidisciplinary activity with open classes  
(approximately 70 students)**

**Working groups of five students**

Step 1. ZERO WASTE” concept

15mins

Challenge question to introduce the lesson:

How many of you believe it is possible to create a society where no waste is produced? How many of you believe we can adopt a 'zero waste' lifestyle?

<https://www.menti.com/alsr15uzwn5h>

1hr

Step 2: EUROPEAN PERSPECTIVE: TARGETING “ZERO WASTE”

TASK: Have a look at the European policy regarding zero waste in the links below. Read and discuss the main ideas.

Cooperative Learning Methodology: read, highlight, discuss and summarize the main concepts by completing the padlet below ( circular economy, zero waste strategy, three pillars). Assign roles within the group.

<https://zerowasteurope.eu/library/zero-waste-europe-strategic-framework-2022-24/>)

<https://zerowasteurope.eu/about/about-zero-waste/>

<https://zerowasteurope.eu/wp-content/uploads/2022/05/ZWE-Strategic-Framework-2022-24.pdf> (pp. 7-12)

[Padlet: Circular Economy and Zero Waste](#)

- a. Explain the meaning of “zero waste” and of “ circular economy” in the Strategic Framework
- b. Explain the three pillars the zero waste strategy is based on.

Step 3. Let’s get more technical: FROM WASTE TO ENERGY. Read the article published by the Politechnic University of Milan

[ARTICLE](#)

Task: Read the article and answer the questions in the online form below:

<https://docs.google.com/forms/d/1eBWdUZke3taFHVtSGxo0qSum2oXzT4P1mclDvqog9Wc/edit> (Italian)

<https://forms.gle/Naw4fwt6KFZzBerA9> (English)

Step 4. Waste prevention and minimization. Analysis of waste management with an example: a plastic bottle. Several options to get rid of it are considered from WtE, recycling, reuse up to refuse.

- a. Watch the presentation:  
[https://docs.google.com/presentation/d/1aogeBKx-rBG6bRrKiE3qeyymmhbvHC48n/edit?usp=drive\\_web&ouid=111630775463803062531&rtpof=true](https://docs.google.com/presentation/d/1aogeBKx-rBG6bRrKiE3qeyymmhbvHC48n/edit?usp=drive_web&ouid=111630775463803062531&rtpof=true)
- b. Watch the video about plastic pollution and Dianna Cohen’s proposal :

45 mins

	<p><a href="https://www.ted.com/talks/dianna_cohen_tough_truths_about_plastic_pollution">https://www.ted.com/talks/dianna_cohen_tough_truths_about_plastic_pollution</a></p> <p>Task: Choose another kind of waste and consider its management options. Make a presentation about it</p>	
Learning by doing	<p style="text-align: center;"><b>LEARNING BY DOING:PBL METHODOLOGY</b></p> <p>1. Separate waste collection to make a difference</p> <p>a. Discover the initiative started by Legambiente, Italy's most prominent non-profit environmental organization, with the support of the Ministry for the Environment. Since 1994 an award has been granted to the municipalities and local communities which have reached significant results in waste management.</p> <p>b. Analyse the data present in the latest report regarding your Region  <a href="https://www.ricicloni.it/iniziativa">https://www.ricicloni.it/iniziativa</a>  <a href="https://ricicloni.it/media/edition/pdf/Dossier_CR_Lombardia_20221209094372.pdf">https://ricicloni.it/media/edition/pdf/Dossier_CR_Lombardia_20221209094372.pdf</a> (page 10 and 11)</p> <p>c. Problem Analysis: our municipality is not present in the list of the best Municipal Waste Recycling Programme</p> <p>c. <b>PBL TASK</b> : Taking action. What can be done to have Arconate be enlisted among the greenest municipalities in Lombardy? Why has this not happened so far?</p> <p>c. Draw up your own plan and project for the municipality of Arconate to reduce waste collection and improve waste management</p>	6 hrs
<b>Reflective learning</b>	Group Project Presentations Follow up	2 hrs

<b>Evaluation</b>	Evaluation of projects and presentations. Follow up	2hrs
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