

NOSS RETHINKING PLASTIC POLLUTION

VOLUME 4

WHY ARE **SINGLE-USE** PLASTICS A PROBLEM?

ESCOLA DE ARTES CIÊNCIAS E HUMANIDADES

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Núcleo de Pesquisa em
Organizações, Sociedade
e Sustentabilidade

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WHY ARE **SINGLE-USE** PLASTICS A PROBLEM?

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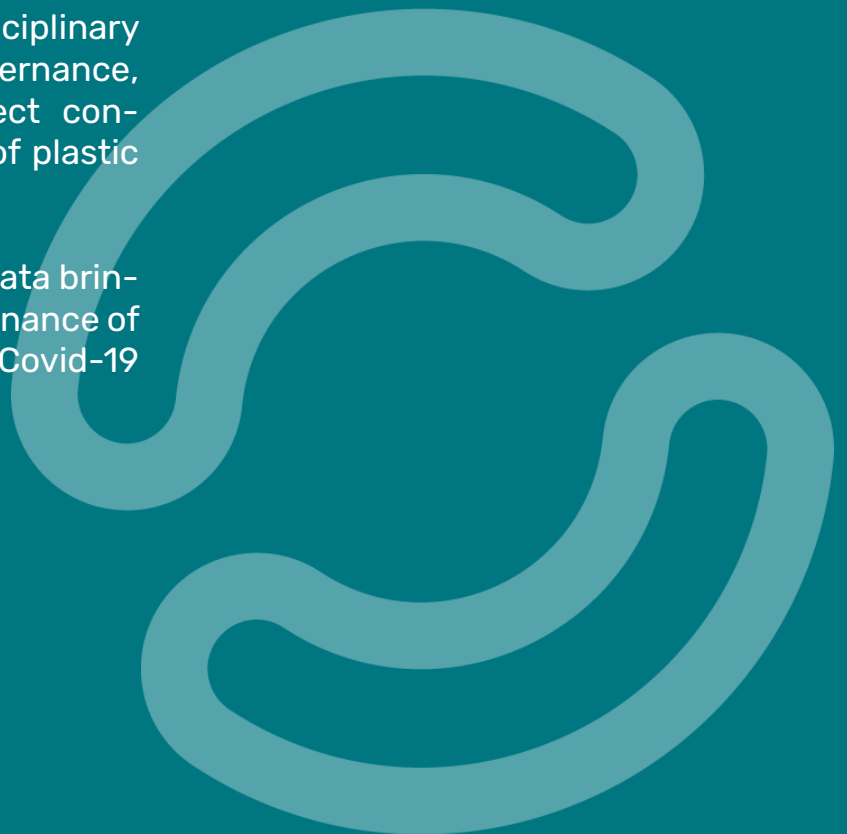


FOREWORD

This is another result of the project “Rethinking plastics Governance in a Post-Covid World,” funded by the University Global Partnership Network (UGPN). This project is a collaboration between researchers from the University of São Paulo, the University of Surrey, and the University of Wollongong, forming part of the UGPN Rethinking Plastics Network.

The project aimed to verify the plastic pollution policies before, during, and after the Covid-19 pandemic through an interdisciplinary team. To this end, regulations, governance, and oversight structures that affect consumption and society’s perception of plastic materials were evaluated.

This qualitative study of secondary data brings the Brazilian situation in the governance of single-use plastics in the face of the Covid-19 pandemic.



SUMMARY

★	GLOSSARY	6
★	CONTEXT	8
★	INTRODUCTION	9
★	HOW TO USE THIS MATERIAL?	10
★	PLASTICS: SOLUTION OR PROBLEM?	11
★	PLASTICS IMPACTS ON ANIMAL LIFE	12
★	THE CRISIS CAUSED BY PLASTICS	14
★	THE PLASTICS PRODUCTION CHAIN	17
★	WHY SHOULD WE IMPOSE LIMITS ON PLASTICS PRODUCTION?	18
★	THE "5 WHYS" TECHNIQUE	19
★	PUBLIC POLICIES	20
★	PEDAGOGICAL SUGGESTIONS	26
★	DEBATES	21
★	VIDEO PRODUCTION	22
★	GAMIFICATION / ROLE PLAY GAME (RPG)	23
★	ZERO PLASTICS DIARY	24
★	CALL TO ACTION!	25
★	REFERENCES	26

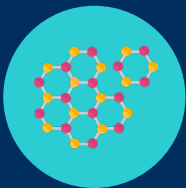


GLOSSARY



PLASTIC

Refer to a synthetic material from polymers such as PVC, polyethylene, or nylon produced from fossil fuels. One of its most distinctive properties is its flexibility, which allows it to be molded into different shapes and used in various applications – from packaging and manufacturing to electronics and construction. Another significant feature is its durability, making it impossible to decompose for thousands, even millions of years. In addition, chemicals such as dyes, lubricants, and flame retardants are added to plastic to enhance its commercial use.



POLYMERS

Are giant molecules made up of a chain of simpler chemical units called monomers.



MICROPLASTICS

Are microscopic plastic fragments measuring no more than 5 millimeters in length. They are found in personal care products, polyester clothing, and cigarette filters, among other items. They end up in the water, are eaten by wild animals, and enter our agricultural ecosystems and our bodies. Microplastics have already been found from the highest mountain ranges to the deepest trenches of ocean depths.



SINGLE-USE PLASTICS

Are so-called “disposable plastics” made from chemicals based on fossil fuels, such as bottles, straws, bags, and packaging.

1

CONTEXT

This **Pedagogical Guide** is one of the results of the project “*Rethinking Plastics Governance in a Post-Covid World*,” funded by the University Global Partnership Network (UGPN 2020-2021).

Among the various conclusions produced by the project, one of them was about the importance of expanding the debate on plastic pollution outside the academic environment to include waste pickers, users of basic sanitation systems, primary education students, teachers, and civil society. Thus, intending to raise public attention to this serious problem and contribute both to the formulation of alternatives to it through the development of a more critical view, the project produced a web series in four episodes, which together with this guide, can be used pedagogically as generating themes for the mobilization of different social actors.

In a documentary format, the first episode discusses the origin of the plastic pollution problem, the second episode discusses the limits of recycling as a solution, and the third discusses the alternatives through plastic governance strategies. The fourth and final episode of the web series was developed with a more colloquial and “YouTuber” language to make it more attractive to the younger audience. It can be used in formal and informal education, supported by this **pedagogical guide**.

We hope that this material can offer subsidies to the expansion of a democratic and pluralist debate, in addition to serving as a warning about an almost invisible problem, which has been acquiring enormous proportions, which is plastic pollution.

ENJOY YOUR READING!





2

INTRODUCTION

AUDIENCE PROFILE



High school students, final years of elementary school, and other specific interest groups, such as waste pickers' cooperatives, social movements, civil society organizations, environmentalists, unions, workers' associations and workers in the sanitation and water sector, and from plastics chains, etc.

TEACHING OBJECTIVES



Present and discuss the issue of plastic pollution.



Problematize the production and consumption of plastics in general and single-use plastics in today's society.



Raise awareness through developing critical thinking about the causes and consequences of plastic pollution, including possible ways to solve the problem.

TEMAS RELACIONADOS



Environment



Socio-environmental responsibility



Recycling



Pollution



Health



Public policies



Environmental racism



3

HOW TO USE THIS MATERIAL?

This didactic material was designed to facilitate understanding the main problems related to plastic pollution and to propose reflections for the construction of paths to solve this problem.

It is part of the web series “*Rethinking Plastics*” specifically in the video **Why are single-use plastics a problem?** This material aims to bring the debate about the plastics production and consumption chain closer to children, youngsters, and adults.

This notebook, its activities, and the accompanying videos can be used together or separately, enabling different interactive dynamics in the classroom, political education, or other interest groups.

It is intended that this material will serve as a starting point for a debate of great importance in society, which is plastic pollution, and the information brought here will circulate widely, provoke debates, and contribute to expanding collective consciousness, political organization, and social control over the plastics production, distribution, consumption, and end of life chain in the country.

4

PLASTICS: SOLUTION OR PROBLEM?

THE INVENTION AND ITS CONSEQUENCE

Plastics were developed in the first half of the 20th century. However, after the Second World War, with the industrial gigantism and expansion of international markets, it was no longer just an important commercial product and became a severe environmental problem.

Plastic products take thousands of years to decompose. They fragment into smaller and smaller sizes until they form microplastics and nanoplastics, which contaminate water, air, soil, and living beings.

Almost all plastics are created from non-renewable fossil fuels such as oil, natural gas, and coal. Its production, therefore, depends on the entire logistical chain of production, refining, and distribution of these chemical products, contributing to the emission of greenhouse gases. It is estimated that by 2050, plastics production could account for 20% of the world's total oil consumption.

Finally, plastics are bad for human and environmental health. Their components are known to disrupt the human endocrine system, resulting in hormonal imbalances, even cancer, and infertility. Plastics also harms animals in several ways:



PLASTIC IMPACTS ON ANIMAL LIFE



BY SUFFOCATION

Plastics can cover the nostrils, gills, lungs, or other breathing organs of animals, including invertebrates that live on the floor of rivers, seas, and oceans.



PREVENTING THEM FROM EATING

Plastics can stick to the mouths and beaks of animals, fill their stomachs with particles that give a false sense of satiety, or prevent nutrients from being absorbed, leading to death by starvation.



GETTING IN THE WAY

When adhering to locomotor organs, plastics can prevent or hinder an animal from swimming, running, or flying, making it easy prey for other species, including humans.



DESTROYING THE PLACE WHERE THEY LIVE

The accumulation of plastics destroys the environment where living beings live, preventing them from reproducing, building nests, and feeding their young.

5

THE CRISIS CAUSED BY PLASTICS

More than 150 million tons of plastic waste can be found in our oceans, with 8 million tons being added each year. This is the equivalent of one garbage truck being dumped every minute, 24 hours a day throughout the year. If nothing is done to reverse these trends, the volume of garbage thrown into the oceans per minute could double by 2030 and quadruple by 2050, by which time there will be more plastics than fish in the ocean.

The NGO Break Free from Plastic estimates that from the mass-market adoption of plastic in the 1950s through 2020, at least 8.3 billion tons of plastics have been produced. Furthermore, each year, an average of one million plastic bottles are purchased every minute and up to 5 trillion disposable plastic bags are consumed.

Since then, only 9% of all plastic waste has been recycled, while around 12% has been incinerated. The remaining 79% ended up in

landfills, dumps, or the natural environment, indicating that the solution to plastic pollution has not yet taken place, and possibly will not, through only post-consumer solutions (recycling, landfill, incineration).

In this sense, it is essential to understand that what we call “waste” is the consequence and not the cause of pollution. The cause of the problem is the overproduction and manufacturing of toxic materials that are not biodegradable. The consequence is that all this production becomes waste, that is, “waste” that is not recyclable or reusable, and thus ends up generating more air, soil, and water pollution, as well as demanding more raw material for a new cycle of production and consumption.

Thus, it is crucial to know the production chain, to know where the causes and consequences of the problem are so that we can act on the causes.



8.3

**BILLION TONS
OF PLASTICS
PRODUCED**



5

**TRILLION PLASTIC
BAGS CONSUMED
PER YEAR**



9%

**OF PLASTICS
PRODUCED WAS
RECYCLED**



79%

**OF PLASTICS
PRODUCED IS IN
LANDFILLS,
OPEN-AIR DUMPS,
OR IN THE ENVIRONMENT**



150

**MILLION TONS
OF PLASTICS ARE
IN THE OCEANS**

=



1

**TRUCK EVERY MINUTE,
24 HOURS A DAY**

6

THE PLASTICS PRODUCTION CHAIN

Plastic pollution seems like such a complex problem that it is almost impossible to solve. However, much of this problem is caused by a small number of large companies responsible for manufacturing and distributing single-use plastics. A survey by Break Free from Plastic collecting plastic waste around the world showed that from a total of 346,494 pieces of plastic waste collected in 55 countries, the biggest polluters are Coca-Cola, PepsiCo, and Nestlé, which use plastics mainly to package their products. In addition to the food industries, other major world industries also highly demand single-use plastic, such as the textile, consumer goods, electronics, and transport industries, among others.

The problem of plastic waste is also intrinsically linked to the development of the oil exploration chain, its primary raw material. As demand for fossil fuels declines or becomes volatile, the oil industry has shifted from

fuel production to plastic production to maintain and expand its business.

As intermediaries between these industries and final consumers wholesale and retail establishments offer capillarity for the sale of products. In addition, all these companies have the support of banks and other companies in the financial sector, which subsidize their development.

Finally, there are the organizations responsible for basic sanitation, including collection, cleaning, and waste and sanitary landfills management, which in Brazil are managed by the municipal government, concessionaires, or waste pickers' cooperatives, which are responsible for taking care of all the waste that is produced in the previous steps (Fig. 1). So, ultimately, consumers pay the price for urban cleaning.





	PLASTICS PRODUCTION	PLASTIC USE	WASTE COLLECTION	WASTE TREATMENT	SECONDARY MARKETS
DESCRIPTION	Production of virgin plastics from chemical substances from fossil fuels by a process of polymerization or polycondensation	Use of plastics from the transformation of materials into specific products to the disposal of the product as waste by the end user	Rescue of plastic waste discarded by the end user and separation of waste in several cycles for treatment	Treatment of separated plastic waste through various methods such as landfill, incineration, recycling and dumping	Plastic reuse within an economy after reprocessing waste into secondary material
KEY ACTORS	Petrochemical companies	Plastics transformers ¹	End customers	Local and national authorities	Plastics recyclers
	Oil and gas companies	End customers (individual, institutional and commercial)	Local or national authorities	Regulatory bodies	Plastics transformers
			Waste management companies	Plastics producers	
			Plastics transformers	Waste management companies	
			Plastics transformers		

(1) Producers of plastic products in all plastics markets (e.g., packaging, construction, transport) transform virgin plastics into specific products for use within the economy. These plastic products can be combined with other non-plastic materials during the transformation process. Sources: DALBERG; JAMBECK et al. 2014; World Bank (2018); SITRA (2018).

Source: WWF, 2019

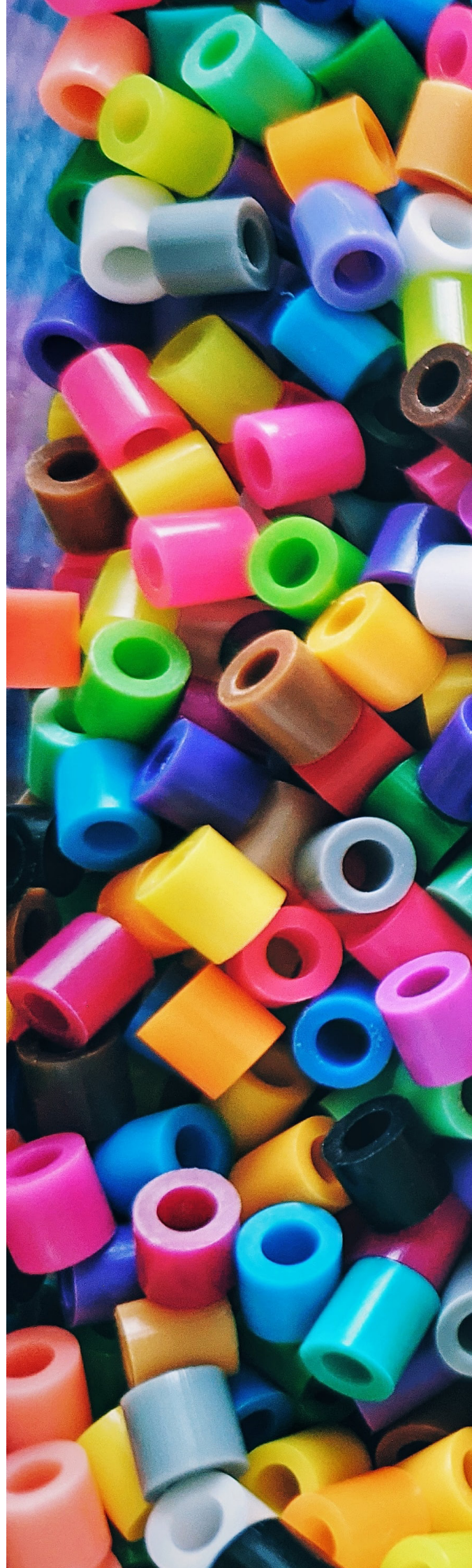


AFTER ALL, WHAT IS THE SOLUTION?

To solve the problem of plastic pollution in a fair, sustainable and effective way, it is important to understand the entire functioning of this production chain, from raw materials to production, consumption, and disposal. It is not about leaving the problem only in the hands of consumers but attacking the problem at its source, demanding that companies stop producing so much plastics since, as we have seen, recycling will never be enough.

Individual solutions, such as encouraging recycling or holding individual consumer choices accountable, are only helpful up to a point. Without adequate public policies, the myths of “false solutions” only perpetuate inequality because they are out of reach for the poor and disadvantaged and generate a false perception about the causes of the problem and possible solutions. In practice, the reproduction of these myths serves to reassure consumers and encourage them to continue buying and discarding, with the illusion that everything will be fine if they do their part.

Consumer-focused efforts forget that solving the plastics problem and reducing the emission of greenhouse gases that cause global climate change demands the mobilization not only of citizens but also of companies, governments, and organized civil society since there is no individual solution to a problem collective. Eliminating plastics is not simply a consumer choice but an urgent action for our collective future.





7

WHY SHOULD WE IMPOSE LIMITS ON PLASTICS PRODUCTION?

It is urgent to understand why we must reduce our dependence on plastics, especially the so-called “disposable” or “single-use plastics”. The first step is to make ourselves and others aware of the problem and the need for change. This is valid for our family, colleagues, students, companies, and government.

In Brazil, as in other countries, plastic production and sales have been rapidly growing in recent decades. The scales of production, consumption, and impacts of this chain are gigantic. A lot is said about the benefits of production over jobs generation and the country’s economy, but much is silent about its environment and social damage.

The large-scale production of plastic generates intense socio-environmental and territorial transformations. The volumes of raw materials extracted, processed, and transported are immense, which requires an even more significant amount of water and energy. In addition to the plastic that will be commercialized, a considerable amount of waste is generated throughout this production cycle, which is buried, discarded in water bodies, or thrown into the atmosphere until incineration, polluting the air, the soil, the entire water network including rivers, seas and oceans.

Although the impacts and risks of the plastics chain are many and of different magnitudes, they are unevenly distributed across social classes, races, and genders. They fall, in a more significant proportion, on groups with less political power and financial resources: rural workers, traditional peoples, residents of urban peripheries, women and black, indigenous, and riverside populations.

Plastic pollution also causes devastation to the region’s natural and historic landscapes, causing damage to tourism and compromising the work and income of populations that depend on these services, such as accommodation, stores, tours, and attractions.

According to studies carried out by the *Federação de Órgãos para Assistência Social e Educacional - FASE*, Brazilian public policies make important decisions about the extraction and use of our mineral wealth to be taken by companies according to their interests of profitability disregarding the harmful economic consequences to local communities, contributing to the increase in inequality levels and advancing traditional and environmentally preserved localities.

Therefore, it is important that the country starts looking at the problem of plastic pollution and developing effective public policies to regulate the sector and promote environmental restoration and historical reparation for the most affected populations.

8

THE "5 WHYS" TECHNIQUE

1

WHY ARE PLASTICS A PROBLEM?

Because the production has been increasing mainly in the last decades, and its manufacturers expect to increase even more.

2

WHY DID THEY ACCUMULATE SO MUCH?

Because it does not disappear in nature, it just breaks up into smaller and smaller pieces, invisible to the naked eye.

3

WHY ARE SO MUCH PLASTICS STILL BEING PRODUCED?

Because it is cheap to produce, the costs of impacts on the environment and health are not included in its manufacture.

4

WHY IS RECYCLING NOT ENOUGH?

Because not all manufactured plastics are collected, and from what is collected, not everything is recyclable.

5

WHY LOOK AT THE CHAIN AS A WHOLE?

Because only then will we begin to act on the cause of the problem, which is manufacturing, and not waste, which is the end of this production chain.



9

PUBLIC POLICIES

Public policies are sets of programs, actions, and decisions by governments (national, state, or municipal) with the direct or indirect participation of other social actors (companies, individuals, civil society organizations, etc.). They establish what a government should or should not do and guarantee certain rights for society or a particular social, cultural, ethnic, or economic group.

Thus, for example, how a local government performs a city's public cleaning is a public policy. Education, health, the environment, and water are universal rights, and to guarantee this right to people, they are inscribed in the Brazilian Federal Constitution and public policies on education and health, for example.

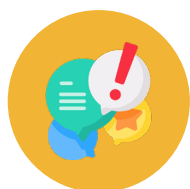
Public policies are essential to ensure rights and duties for the whole of society. In the case of waste management, it is not enough for people to separate the waste in their homes. There must be an infrastructure for collecting and treating this waste, as well as ways to guarantee the responsibility of all the social actors involved in making that product reach consumers' hands.



PEDAGOGICAL SUGGESTIONS

This **pedagogical support guide and the video “Why are ‘disposables’ a problem?”** can support pedagogical activities in formal education or with specific interest groups, such as cooperatives, civil society organizations, and sociocultural collectives.

Depending on the public profile and the time available for the activities, several actions can be developed, either in an interdisciplinary way, associated with specific pedagogical content, or through active methodologies in integrative projects. Table 1 exemplifies some of these possibilities, which will be detailed below.



DEBATES

Presenting the video “Why are ‘disposables’ a problem?” followed by a debate between participants and guests.



VIDEO PRODUCTION

Here it can be included from more elaborate productions (scripted and edited) to more straightforward and “viral” videos such as minute-videos or “tik-toks”.



WALL ACTIVITIES

Creation of murals (physical or virtual) with work done by students.



GAMIFICATION / ROLE PLAY GAME

Small theatrical plays or skits, scripted or not, where each participant can play the role of a particular social group (companies, governments, citizens, etc.)



SEARCH

Various topic possibilities:

- How is the waste disposed of in my city?
- Where does the waste go?
- What are the alternatives to single-use plastics?



THE ZERO PLASTICS DIARY

As a game, the zero plastics diary is a tool that helps you calculate the amount of plastics consumed in a given period.



DEBATES



Debates can be held in the classroom in a variety of formats, for example:

- ★ With small classes, a general debate stimulated by the teacher/mediator through problematizing open questions, such as: what are single-use plastics, and what are their main uses? Could we eliminate single-use plastics? How? What is the importance of different social actors in plastics governance?
- ★ With larger classes, the room can be divided into groups, and each one can discuss a more specific topic. Either from problematizing questions or specific topics, such as the plastics production and consumption chain, the impact on living beings and humanity, the importance of public policies, etc.
- ★ The debate can count on the participation of guests, such as other professors, sanitation professionals, scientists, public managers, etc.



VIDEO PRODUCTION



After watching and debating in the classroom, the class can be challenged to produce their videos and share them on a channel suggested by the teacher (an Instagram page, a YouTube channel, or other social media).

You can make an event like “*Festival do Minuto*” similar to other existing ones (see, for example, <http://www.festivaldominuto.com.br/>).

To increase interdisciplinarity, a small group of professors can compose an evaluation “committee” to choose the best videos and work on guiding groups of students regarding the transversal aspects of their disciplines.





GAMIFICATION / ROLE PLAY GAME (RPG)



The teacher can suggest a play or skit on plastics. After the class has watched the video and debated in the classroom, groups are formed in which each one takes on the role of a social actor: the oil industry, plastics manufacturers, retailers, consumers, waste pickers, politicians, etc. At first, the current situation is staged. Hence, from a moment of a crisis caused by plastic pollution, groups are forced to seek a way out of the problem that must involve abandoning single-use plastics.

Another possibility is to create a broader campaign to engage the entire organization, such as "*A Escola Livre de Plástico*" where the aim is to reduce the use of single-use plastic throughout the school progressively. In this case, the first step is to obtain the approval of the administrative direction and then to mobilize students to identify the uses of plastic in the institution, and its possible substitutes, define goals for gradual elimination and monitor the reduction in each sector: pedagogical, administrative, support (canteen, cleaning, etc.). This mobilization can be structured through a competition or quiz, where each stage is worth points.



ZERO PLASTICS DIARY



The Zero Plastics Diary presents exercises to measure the quantities and types of plastics consumed in each period. The proposal aims to encourage changes in daily habits to reduce plastic consumption.

To access the diary in its entirety, use this [link](#).

This diary was developed within the scope of the Plastic Free Campus of the School of Arts, Sciences, and Humanities at USP. Therefore, it can be used as an inspiration for activities developed in the classroom, which must be adapted to your reality and local context.



A CALL TO ACTION!

The objective of this booklet was to present the problem of pollution by plastics, especially by single-use plastics, and sensitize more people to join a global community that is already actively acting in the face of this problem and the search for solutions.

We hope that people in your school or organization have been able to see the importance of this issue and that they will engage in this fight. Thus, document and publicize your actions to engage as many people as possible about the importance of developing concrete actions to combat plastic pollution.

It is crucial to involve the external community, such as mothers and fathers, families, neighbors, the media, commercial establishments, companies, and public institutions. In this context, the message of combating this type of pollution must reach managers and politicians so they can mobilize and engage. The challenges are many, but there is also much that can be done, and it will only be done when there is greater protagonist of various social actors.

Finally, we recommend you continue studying, seeking correct, reliable information, and fighting fake news.

**HAPPY READING
AND GOOD WORK!**



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