

An aerial photograph of a beach heavily littered with discarded plastic water bottles and other debris. In the foreground, a teal-colored silhouette of two people standing side-by-side is superimposed over the image. The background shows a vast expanse of sand and water, with the litter scattered across the shoreline.

# LACMA

Design Dilemmas Exhibition Series:  
Plastic Water Bottles  
3 March - 1 August 2019



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## Design Dilemmas Exhibition Series: **LACMA**

Design Dilemmas is an exhibition series that travels across the United States and examines critical moments in design history. The series shows the value of looking ahead to see the consequences of design. This exhibition asks you to consider the question: how were we tricked into paying for something we can get for free?

How we deal with the environment is the most critical issue of our time because we are at a point where every decision we make is crucial to the survival of our and every other species. This sense of urgency needs to be felt not only by politicians, but also by citizens. If we care about any aspect of the impact of plastic on the environment, we can both make changes in our own lives and spark political change. It is vital for us to not only understand the impact of plastic water bottles, but also to understand how design is the reason it has become a catastrophe. By looking at design with a critical eye, we can question what we see, what we believe, and why we act.

Visitors to this exhibition will be able to see the incredible impact that art and design can have on the world and the dangers that come along with it. This exhibition was originally going to be in the California Science Center, but while people who go to a science center already want to learn about science and the environment, people who go to an art museum do not necessarily expect to see a critical side of design. LACMA was also selected because it is located in a big city in the United States where American tourists and locals frequent. It is important for Americans to see this exhibition because with a president who is actively rolling back environmental regulations, the citizens of this powerful and influential country have the opportunity and responsibility to fight back.



Bird found dead with plastic in its stomach that it had eaten

**“Sustainability is about using current resources in a way that we can pass them on to the future generations; it is about preserving the ecological capital.”**

- Zero Waste Europe

Summary:

## Impact of Plastic on the Earth

Plastic can be recycled, so what's the problem? In fact, there are seven types of plastics with labeling that is not commonly understood by the general public. There are two types that cannot be recycled (including plastic caps in some areas). Even though the vast majority of plastics can be recycled, a shocking 91% cannot.

According to National Geographic, 8.3 billion metric tons of plastic has been produced, and 6.3 billion metric tons of that has become plastic waste. These numbers seem crazy considering that plastic was only really popularized in the 1960s. Plastic takes over 400 years to biodegrade, so all that has ever been made still exists in some form: 79% in landfills or the natural environment. Another 8 million tons of plastic ends up in the oceans every year.

All these statistics seem depressing, but it is an issue we have the power to better. Think about how much you use plastic in your everyday life. Even that plastic Tupperware you bought to save plastic bags will also have to end up as waste in a relatively short time. Recycling is better than putting plastic into landfills, but it is not stopping the source of production. Since all this plastic still exists and continues to accumulate at an enormous rate, recycling is not sustainable enough.



Summary:

# Impact of Plastic Water Bottles

The impact of plastic is not the only problematic aspect of plastic water bottles. There are many unsustainable practices that occur before we throw the bottles away. For example, it takes 1.63 liters of water to make every liter of Dasani. Dasani, like many companies, gets their water from California, which already goes through periods of severe droughts due to the massive amount of water the state uses for agriculture.

How does plastic waste relate to climate change? The EPA explains on its website, “Most direct emissions come from the burning of fossil fuels for energy. A smaller amount, roughly a third, come from leaks from natural gas and petroleum systems, the use of fuels in production (e.g., petroleum products used to make plastics), and chemical reactions during the production of chemicals, iron and steel, and cement.” We don’t usually think about how plastic itself is made, but the process of extracting fossil fuels like oil and natural gas releases toxic emissions. To state it in an oversimplified way, pollutants such as carbon monoxide, hydrogen sulfide, and methane gas cause extreme greenhouse effects, which in turn lead to climate change.



Part of the Pacific Garbage Patch



Oil spill; plastic is made from petroleum



Effect of drought on California land



**Climate change** is a very abstract issue for many people to comprehend. It's hard to believe the vast ways scientists say it will and already is changing our lives. Maybe you don't care about the beauty of nature or the future of diverse species, but climate change will undoubtedly impact something you do care about.

**Fishing and scuba diving** are being affected by the rapid decline of marine species diversity due to climate change and plastic pollution. When a fish ingests plastic, it will bioaccumulate up the food chain, making some bigger fish unsafe for human consumption. In addition, events like coral bleaching are ruining some of our most precious tourist attractions.



For example, **hunting** will be much more difficult if animal populations continue to decrease at the rate they are now. In fact, there are companies like Ducks Unlimited that are dedicated to the symbiotic goals of conserving duck populations for the species itself and so that people have enough to hunt.



A new study suggests that climate change will make **beer** double in price. Climate change is affecting barley crops, and farmers will have to go to greater, more expensive, lengths to sustain barley through increasingly arid seasons.



If you want to be **fit and healthy**, eating more plant-based foods and less meat is proclaimed by many scientists and nutritionists to be one of the most effective strategies. Luckily, eating less meat is also a change we can make in our personal lives that can have a major impact on lessening climate change.



If you enjoy **golfing in Florida**, you should know that the National Oceanic and Atmospheric Administration predicts that the sea level will rise in Florida by 34 inches by 2050, and it could go up to 81 inches by 2100.





## Summary:

# Human Health

While many people are aware of the harmful effects of plastic water bottles on the *planet*, most do not know too much about how they could be harming *us*. The FDA (Food and Drug Administration) regulates plastic water bottles, and the EPA (Environmental Protection Agency) regulates tap water. The bottom line is that the EPA has stricter regulations than the FDA, including requiring more water testing and disclosed information about tap water quality. In contrast, the FDA treats bottled water as a food and does not require companies to tell neither their customers nor federal regulators where the water came from and what contaminants it has. Some studies have suggested that chemicals used to make plastic bottles leech into the water over as short a time as ten weeks, which could lead to disruption of hormones and further health risks.

The purpose of presenting an overview of this information is not to create a conspiracy theory against water bottle companies, but to question the common misconception that bottled water is inherently cleaner and healthier than tap water. In fact, it is estimated that at least 25% of bottled water is actually just tap water. There are, of course, cases where tap water is not safe to drink in certain places, and that will be addressed later.





We produce almost  
**20,000**  
plastic bottles  
every second.

## History of Water Bottle Design

It is an interesting disparity in the United States that even though the amount of clean water we have access to is a luxury compared to the rest of the world, the second most consumed beverage in the U.S. is bottled water. So how did we become convinced to pay for something that most of us can get for free?

Let's start by looking back at the first water bottles that were sold commercially. Plastic water bottles did not actually become popular until 1973 when high-density polyethylene, which can withstand carbonation's pressure, was introduced. Compared to the common glass bottle, these new plastic bottles were lighter in weight and would lower production and transportation costs. (Although lighter transportation is environmentally important, that benefit pales in comparison to the other environmental costs.) Plastic bottles became popular not only for water, but throughout the food industry. Part of this surge could be connected to the western "on the go" culture, with many people taking this luxurious efficiency for granted without considering the long-term consequences.



1622

Water is first bottled for sale in the United Kingdom's Holy Well bottling plant. The practice grows popular with the bottling of mineral spring water across Europe and the U.S. in the 1700s, since the **natural springs are believed to have healing and therapeutic effects**. For this reason, bottled water is often sold as a medicinal remedy in pharmacies until the 1900s.

1783

In an effort to mimic the fizziness of mineral water, Johann Jacob Schweppe manufactures **carbonated water** in Geneva, Switzerland, founding the eponymous Schweppes Company.

1809

Carbonated water starts its boom in the U.S. after Joseph Hawkins receives a patent to produce "imitation mineral water." Soon after, production booms, thanks to **advances in bottling speed and decreases in glass costs**. This, coupled with the **public's fear of cholera and typhoid**, leads to millions of bottles being sold annually in the U.S. by the mid-1800s.

1905

An English doctor ends the waterborne typhoid epidemic with chlorination, which uses chlorine to kill dangerous bacteria. The process is soon introduced in other countries as well. **The demand for purified bottled water wanes.**

1973

**Polyethylene terephthalate (PET)** bottles are patented. They are the first plastic bottles that can contain the pressure of carbonation, thus creating a much **cheaper alternative** to bottling than was possible with glass.

1977-81

Perrier positions itself as "Earth's First Soft Drink" with a series of print and television ads, benchmarking the moment when bottled **water begins its commercial dominance** (although the initial boom is just for sparkling mineral water - not flat water).

Early 2000s

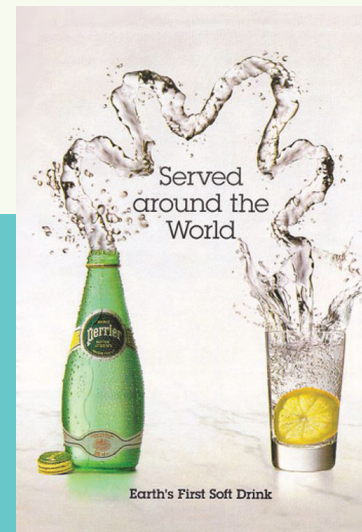
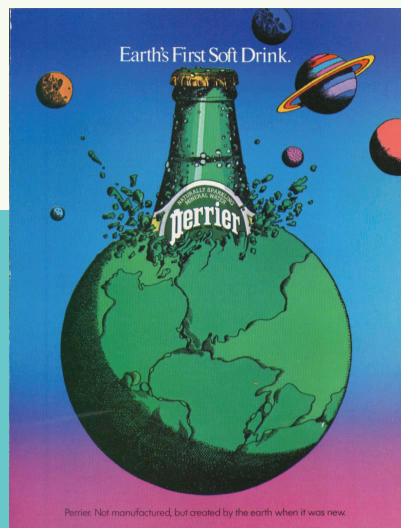
The tap vs. bottled war is fully engaged, with beverage **companies playing to consumers' fears of illness and contamination from tap sources**. One major player in the assault on tap water is Brita filters, with ads that say "Tap and toilet water come from the same source. Don't you deserve better?"

2011

Thanks to **EPA regulation**, the average weight of a 16.9-ounce PET plastic water bottle is down 47.7% from the year 2000, clocking in at just 9.89 grams.

2012

U.S. annual consumption reaches 9.67 billion gallons - that's an average of 30.8 gallons per person. Residents of Louisiana, Texas, and Arizona consume the most, but as a whole **we're drinking more bottled water and less tap water** (36 gallons fewer than we did in 1980), fueling domestic bottled water sales of \$ 11.8 billion.





# Visual Communications and Advertisements

Plastic bottles are prevalent throughout the food industry, but disposable plastic water bottles are a particularly interesting case. Plastic is so obviously harmful to the environment and possibly even to our health, so why are they still so popular? This is where design comes in. Plastic water bottles are a prime example of people not noticing the most successful design. The last few pages covered the history of the design of the bottles themselves, but the promotional materials around plastic water bottles have been an even bigger part of their success.

Begin by looking at the logos of the most profitable plastic water bottle companies. Then, see what themes you notice in the advertisements.



Dasani made \$1,082.02 million in 2017



Aquafina made \$1,079.36 million in 2017



Arrowhead, owned by Nestle, says they don't need to follow CA state laws about not bottling in drought-ridden areas because they use Native American land



Glaceau made \$495.56 million in 2017



Poland Spring made \$690.27 million in 2017



Fiji made \$424.45 million in 2017



Deer Park made \$414.4 million in 2017



Nestle Pure Life made \$908.92 million in 2017





Poland Spring Born Better ad



power couple.

vapor-distilled for purity,  
electrolytes for taste.



running mate.

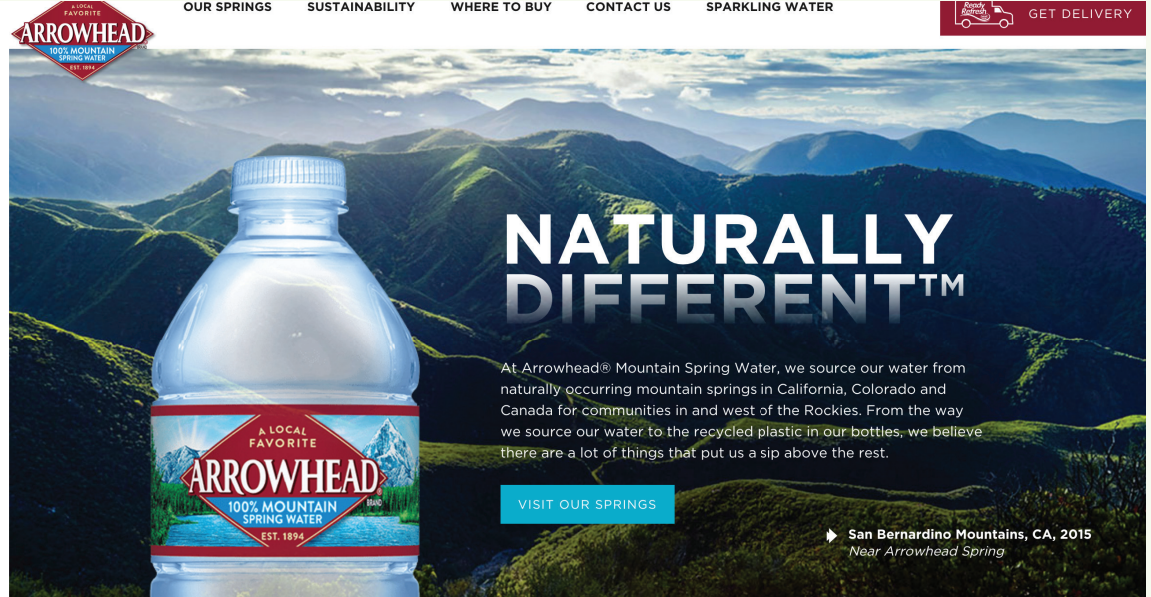
vapor-distilled for purity,  
electrolytes for taste.



Smart Water Jennifer Aniston ads



Aquafina New Shape ad



Arrowhead website homepage

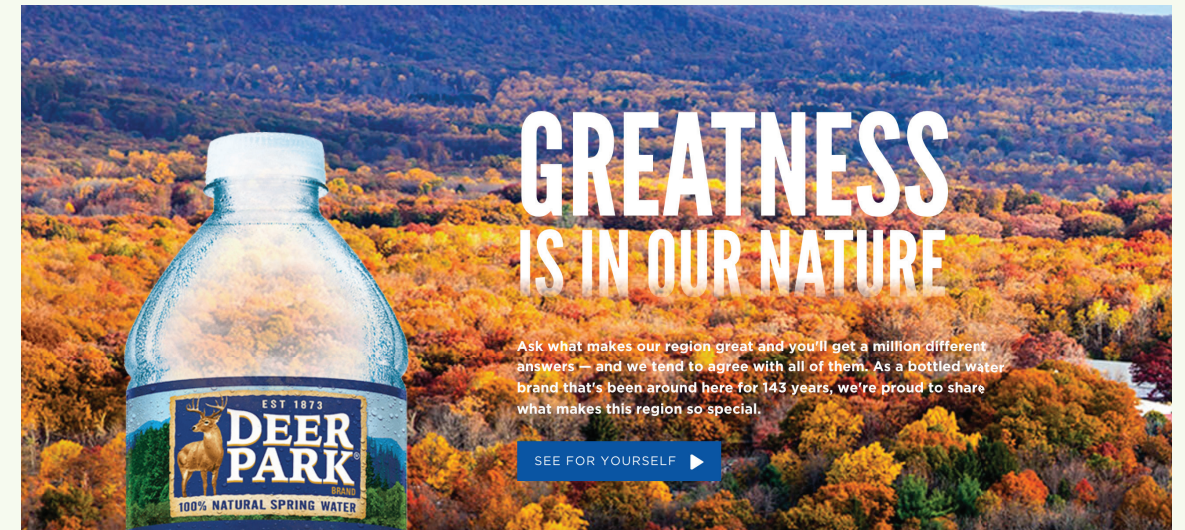




Smart Water website homepage



Dasani Drink Up ad



Deer Park website homepage



Nestle Pure Life ad

These advertisements promote a view of pure nature, using **images** of serene locations, earth tone **color schemes**, sleek and minimalistic **typefaces**, and pointed **language**. When you look at these ads with a critical eye and think about the big corporations behind them, you become aware that these water bottle companies are competing, both with each other and with free tap water, for your business. There are not many hard facts they can promote about the sustainability of their plastic and water extraction, so they instead create an image that consumers want to believe. We want to be a part of that “healthy” or “smart” club. The companies do not shy away from the environmental argument against them; they instead hit the issue head on by creating an image of purity that directly contradicts their critics.



Fiji is a great example of **greenwashing**, which is when a company promotes an environmental image in order to sell an unsustainable product. By creating this image of nature without human interaction, Fiji is blatantly lying because we now know how many resources go into manufacturing those bottles and that humans are to blame when all that plastic ends up harming the environment. However, they know that we won't buy a plastic water bottle because it is an amazing and innovative idea; they know that we'll buy it because we are buying into the image that they have created. Greenwashing misleads consumers in a dangerous way by covering up the companies' harmful practices and then further enticing us with a gilded fantasy.



Fiji website homepage



From "Created by Nature" commercial



Fiji sustainability ad



From "Nature's Gift" commercial



Untouched by Nature ad

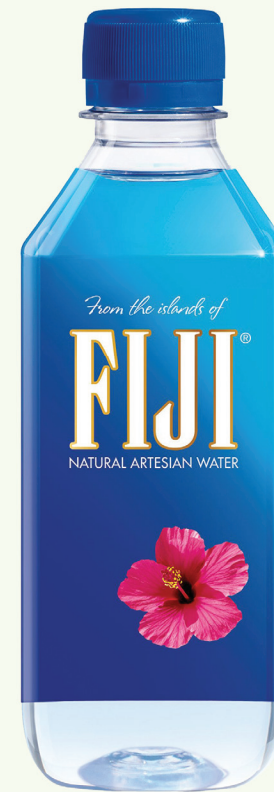


Fiji Fit ad



# Bottle Design

The shapes of water bottles, which vary across companies, are carefully designed with their intended consumer in mind. Target audience also varies across companies. For example, Smart Water is geared toward younger consumers with its sleek, minimalistic design. Take a look at these and see if you can tell how the design of the bottle itself relates to the messages we saw promoted in the advertising.





# Ethical Dilemmas

Even though plastic water bottles were only commercialized 50 years ago, we have become reliant on them. There are many examples of cases in which plastic water bottles are now necessary for survival. In rural communities, there is a higher likelihood of water contamination from pesticide runoff. Since the EPA requires annual quality reports of tap water, you can call your state drinking water program or the EPA Safe Drinking Water Hotline at 800-426-4791 to inquire about your area.

In places with unsafe tap water, such as Flint, Michigan and non-industrialized countries, plastic water bottles have been life-saving. Should we eliminate these disposable bottles altogether and cause those hundreds of millions of people to suffer? Of course not. But those people aren't the issue. It's the rest of us, particularly in the United States, where the vast majority have access to clean tap water and still use bottled water. In this exhibition, we have seen the role that manipulative design has played in creating plastic water bottles' success. But what should we do about it?



Life Wtr's mission is to support emerging artists through the sale of water bottles



# Solutions?

**Creative Solutions:** these are fun and creative ways to use recycled plastic from water bottles, but again, there is a time when we will also throw these products away at the end of their use. The further issue to consider is that if different types of plastics are mixed to make these products, they may no longer be recyclable.

**The Ocean Cleanup:** this project, created by a teenager, aims to remove 50% of plastic from the ocean so that it can be recycled on land. Many scientists are skeptical, but even if it does work, the project does not address the source of the problem: 8 million tons of plastic will continue to enter the ocean each year.



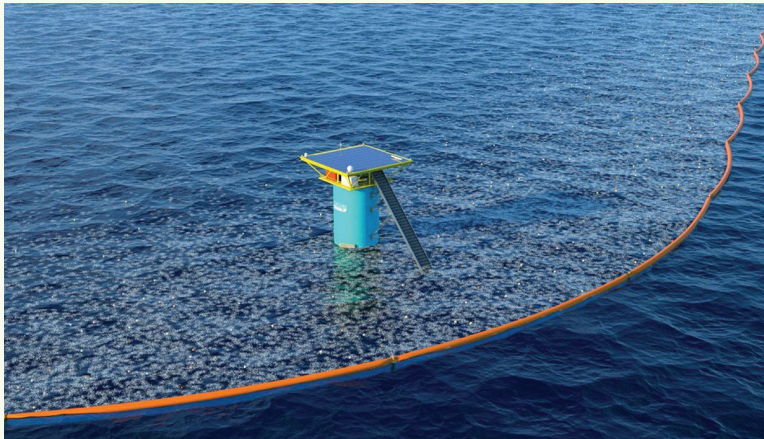
B2P pens are made from recycled water bottles



Recycled water bottle bench



4Ocean collects trash from the ocean and turns it into bracelets





**Reusable Water Bottles:** having a reusable water bottle is definitely better than using disposable bottles, but it is not a perfect, permanent fix. Shipping and packaging add to the environmental cost, and they still use the finite materials of metal and plastic.



**Britta Filters:** with a filter, you can get your tap water for free and know that it's a lot cleaner than it would be both straight from the tap and from disposable bottles. However, is the best solution to the plastic problem to tell everyone to buy a different plastic product that they will also eventually throw away?

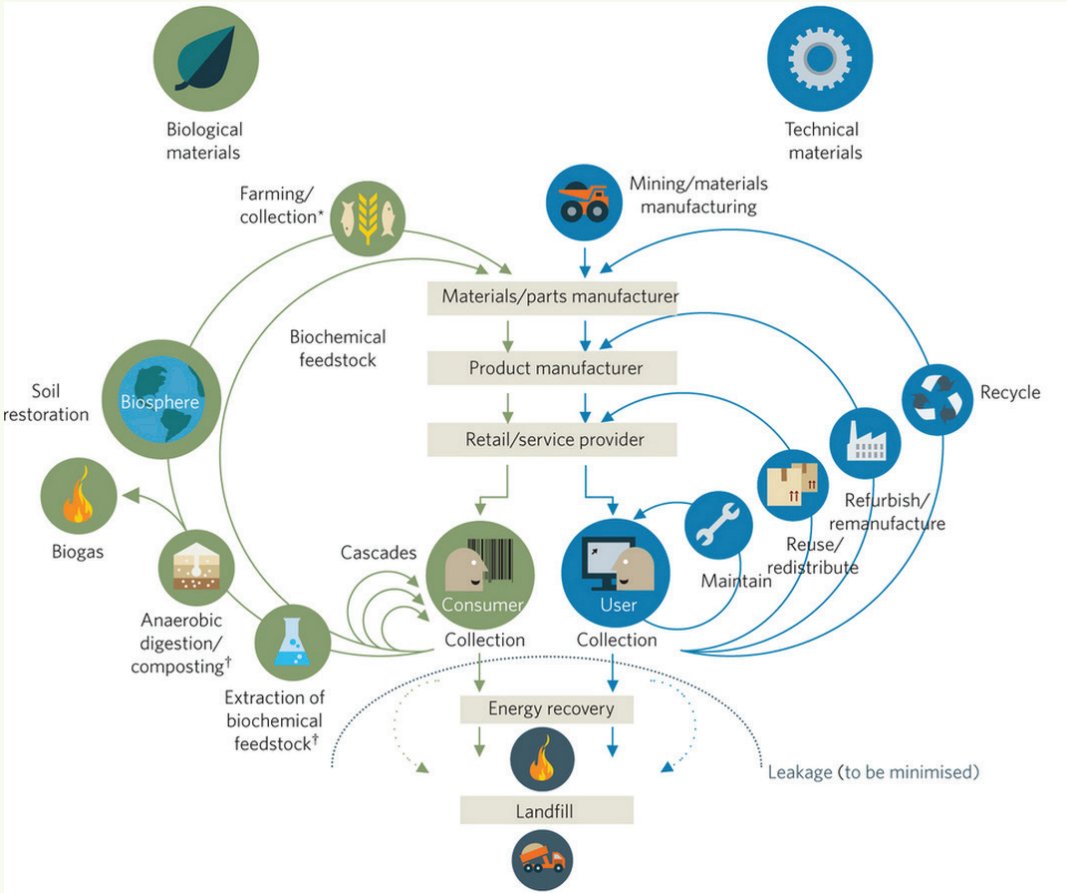
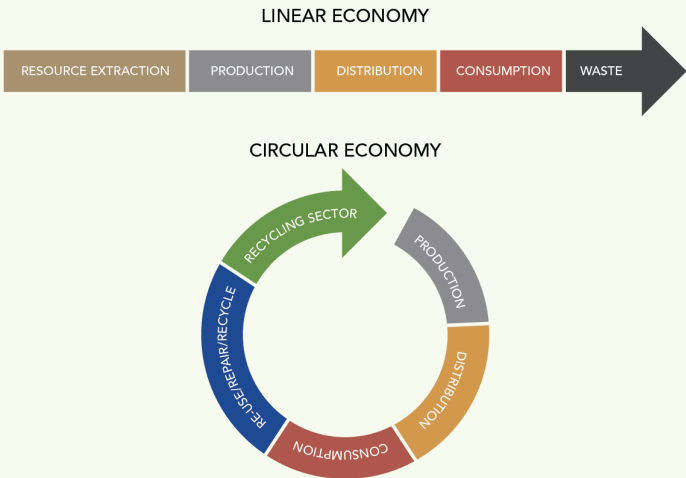


Brita ads: “Last year 16 million gallons of oil were consumed to make plastic water bottles.”

**Circular economy:** a system that decreases resource input and waste. Humans can live in a less linear way (make, use, dispose) and can instead mimic nature’s sytems, which regenerate materials.

“Shifting to a real circular economy for plastics is a massive opportunity to close the loop, save billions of dollars, and decouple plastics production from fossil fuel consumption.”

- Dame Ellen MacArthur





# How Can I Make a Difference?

Think critically about the effects of design on the decisions you make

Make decisions in your own life that help decrease waste

Spread the word about the urgent need to decrease the demand for plastic

Participate in a beach cleanup or other volunteer opportunity

Write letters to your government representatives about the urgency of protecting the environment

Donate to environmental organizations, like the National Resource Defense Council (NRDC)



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