



"A whopping 91% of plastic isn't recycled"
- Laura Parker of National Geographics

How Plastic is Affecting the Earth

By. Matthew Rogers, Caitlyn Munden, Mason Munden,
and Zachary Suvannalath

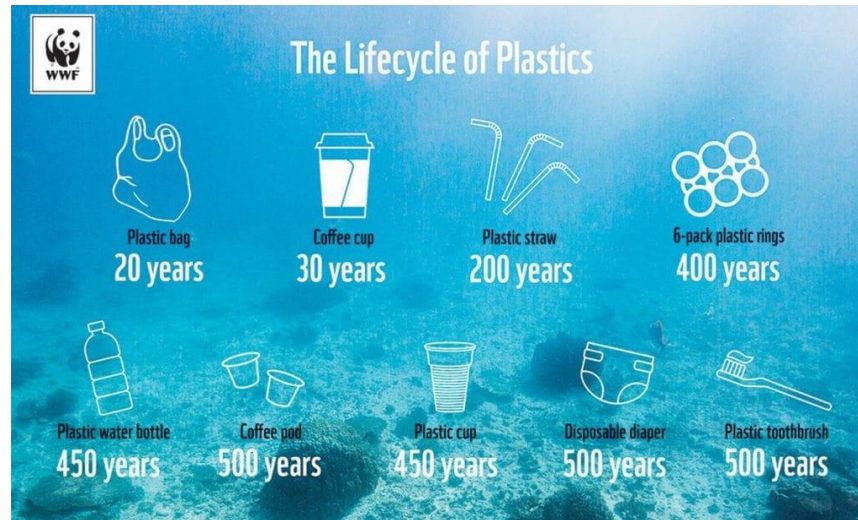
Principles of Biology
Professor Seibert, Ted

EMFACTS Project
Northwest Arkansas Community College
Bentonville, Arkansas

The Biggest Contributors of Plastic

- ▶ We have read all about it for decades. "landfills are overflowing, marine ecosystems are facing severe degradation, trees and plants are unable to breathe." All of this because of the excessive use of plastic.

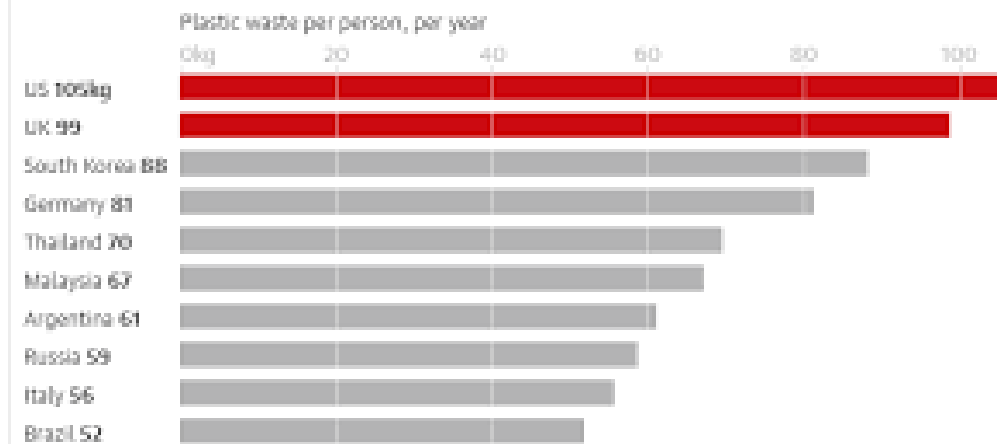
Figure 1: This diagram represents how long plastics that are used every day take to decompose.



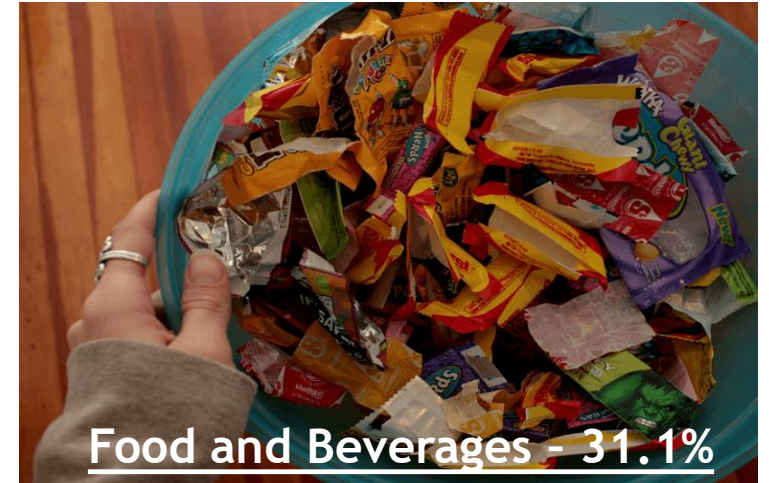
- There has been more than 8.3 billion metric tons of plastic produced across the world.
- Studies show that the U.S is one of the biggest contributors often shipping plastic waste illegally to other countries.
- Major food companies also produce massive amounts of plastic that can be potentially substituted for other material.

Figure 2: The chart shows the countries that produce the most plastic waste per person.

US and UK citizens produce the most plastic waste



Guardian graphic | Source: Low et al., Science Advances 2020



The Biggest Contributors of Plastic

- ▶ Single use plastic is the highest contributors of plastic waste all over the world. Contributing close to 50% of all plastic produced each year.
- ▶ These single used plastics often end up in oceans, roads, and even in sewers harming the environment.

Different Ways Plastic Affects the Earth



Ocean



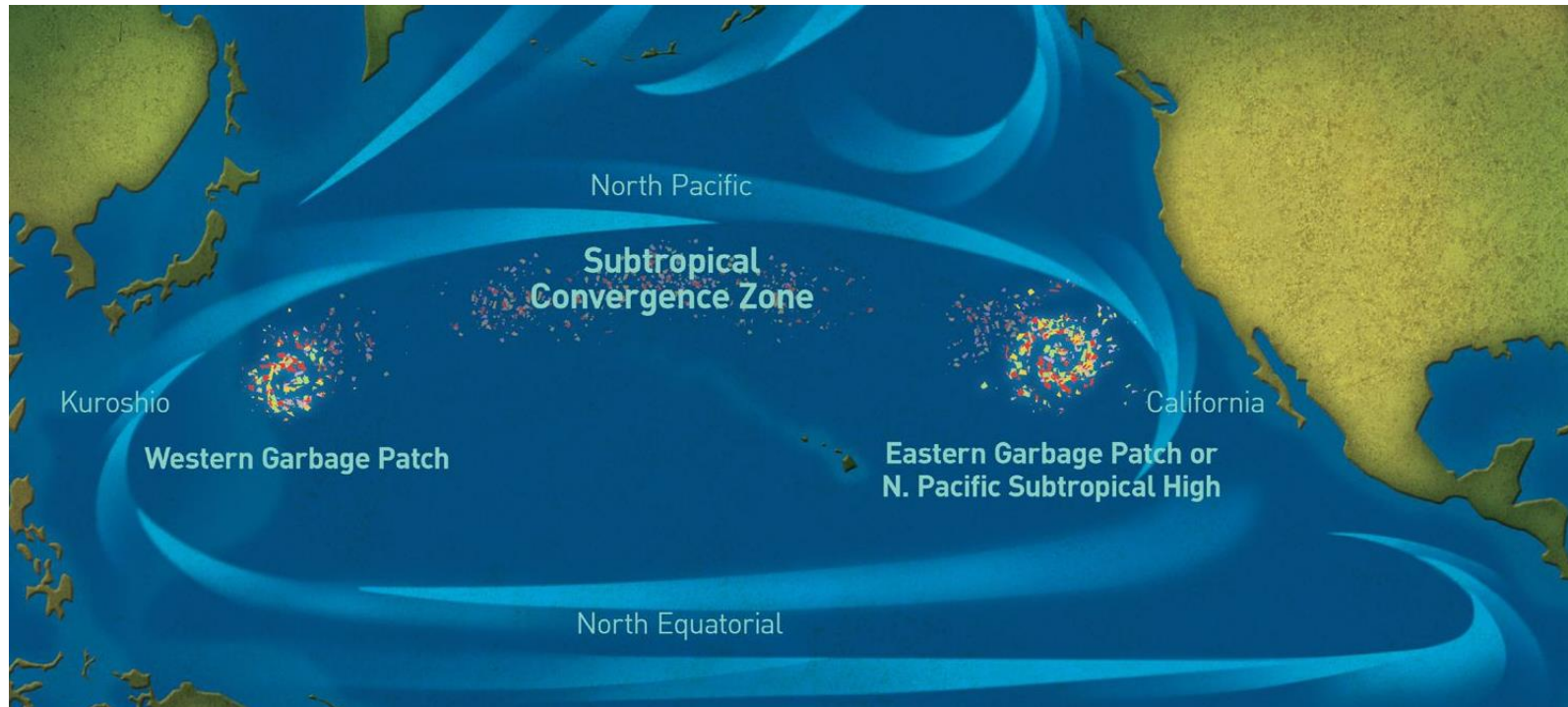
Air



Land

Ocean Pollution

- ▶ Considering oceans make up a majority of our planet's surface, they are especially susceptible to plastic pollution
- ▶ Annually, there are around 8 million metric tons of plastic that are thrown into the ocean. Of those, about 236,000 tons are micro-plastics, which are one of the biggest threats against marine environments and wildlife¹
- ▶ If current trends continue, the amount of the plastic in the oceans will surpass the amount of fish (by weight)². Every minute, one garbage truck of plastic is dumped into our oceans³
- ▶ There are 5 massive patches of plastic in the oceans around the world, with one of the largest (The Great Pacific Garbage Patch) being about the size of Texas⁴



The Great Pacific Garbage Patch

“Great Pacific Garbage Patch.” *National Geographic*

Plastic Pollution in Freshwater Systems

- ▶ In Northwest Arkansas we are especially aware of plastic pollution in our lakes
- ▶ Beaver Lake, which provides drinking water to most of the region, is subject to constant clean-ups due to the amount of plastic pollution from visitors
- ▶ In a report by the city of Fayetteville from 2019, single use plastics accounted for one of the largest contributors of pollution in the lake and the White River that travels to Fayetteville¹
- ▶ The Beaver Watershed Alliance reports that the largest source of waste by volume is plastic²
- ▶ Most volunteers that participate in the water clean-ups are recorded as saying most of the pollution is littering from lake visitors²



Factories

- ▶ Factories that create plastics emit thousands of pounds of gases and chemicals in the air each year
 - ▶ Sulfur Dioxide (SO_2)
 - ▶ Carbon Dioxide (CO_2)
 - ▶ Fine Particulate Matter ($\text{PM}_{2.5}$)
- ▶ These gases are known to cause many harmful side effects to people
 - ▶ Asthma
 - ▶ Lung Cancer
 - ▶ High Blood Pressure

Open Burning

► Factories aren't the only problems when dealing with air pollution, the open burning of plastics and waste also effect the air.

In Sebastian County, Arkansas, the Solid Waste District works hard to establish a ban on the open burning of waste

- Plastic
- Rubber
- Construction waste

Sebastian County Solid Waste District says that the inhalation of these smoke particles can cause bronchitis, emphysema, asthma and lung cancer.



Plastics affect on land



- ▶ Municipal solid waste landfills are the landfills that receive common household plastic
- ▶ When materials are broken down in landfills, carbon dioxide and methane are released into the environment.
- ▶ Methane is heat holding which contributes to global warming.
- ▶ Amounts of plastic in landfills has increased through the years
- ▶ In 1960 there was 390,000 tons of plastic in the landfill. In 2018 there was 27,030,000 tons of plastics in landfills.



Plastics Affect on Land

- ▶ Only 2% of recycled plastic is reused for something made of equal value. 8% is converted into something of lower quality.
- ▶ The U.S. was shipping their plastic recycling off to other countries such as Thailand and China, but these countries have recently stopped helping the U.S. The only way to stop the need to share the recycling is to stop the production of so much plastic.
- ▶ Although a good amount of plastic makes its way into landfills, they are often light enough to blow out and end up in other areas. Also, as plastic ages it breaks down into micro plastics which can also float to different locations.

How does plastic affect our community?

- ▶ Northwest Arkansas's growth in population each day has also shown an influx of plastic waste.
 - ▶ "During a recent stream cleanup of Town Branch Creek in Fayetteville (which is the drinking water supply for Northwest Arkansas), we found that plastic and Polystyrene / Styrofoam were the most common litter in the creek, comprising up 26% (by volume) of total litter."
 - ▶ Plastic is being thrown into landfills that could be recycled instead or reused.
 - ▶ In an article from KNWA News it says, "Fayetteville has thrown 46,000 tons of waste into the Tontitown Landfill"
 - ▶ Plastic from local fast restaurants are produced in massive amounts and often take many years to decompose.



Solutions

- ▶ Reducing fuel emissions during production of plastic by using windmills or solar energy.
- ▶ Reusing single use plastic before it becomes unusable.
- ▶ Recycling single use plastic. Separate plastic from everyday trash.
- ▶ Switching out many single use plastics for more permanent items. Bringing a reusable straw everywhere is a great alternative to getting a single use straw from several places.

Sources:

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- ▶ <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/plastics-material-specific-data#:~:text=In%202018%2C%20landfills%20received%2027%20million%20tons%20of%20plastic>
- ▶ <https://www.theguardian.com/environment/2020/oct/30/us-and-uk-citizens-are-worlds-biggest-sources-of-plastic-waste-study>
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