

Merit

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What's the problem with Plastic Pollution in the ocean

One of the most impactful environmental issues currently facing our planet today is marine plastic pollution. Us humans are solely the ones to be blamed for this problem. Many of the plastics we use today are difficult to degrade, meaning that it is chemically near impossible to decompose. Given this information, this is why they are progressively filling up our oceans and causing serious problems for marine life and ecosystem, and human health. Marine animals are a common victim of plastic pollution. Mistaking them as food, marine animals ingest the piece of plastic. This can lead to subsequential health problems and internal suffocation, therefore decreasing the amount of marine animals in the ocean. Plastic debris can release harmful chemicals into the ocean environment which can also lead to health problems for sea life and humans.

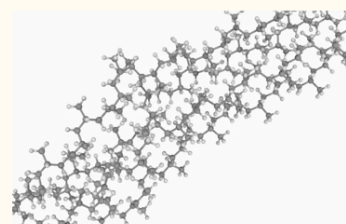
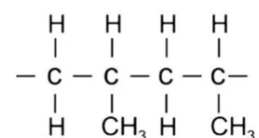


What are the chemical structures of Plastic? [Link](#)

Plastics are like other substances, they consist of molecules and the matter is made up of small particles. Plastics have both large and small molecules called Polymers. Polymers consist of many identical small particles that are strung together like chains. These small individual particles are called monomers. The length of the polymer chains regulate the properties of plastics. For example, the length of the polymer chain for polyethylene determines the solidity of this type of plastic. The chemical formula for Polypropylene plastic is $(C_3H_6)_n$.

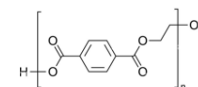
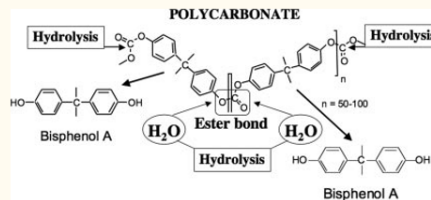
Polypropylene Plastic

Chemical Structure



Why isn't plastic biodegradable? [Link](#)

The problem with decomposing plastic is that plastic isn't organic. Most plastic in the world we use today are made of polyethylene terephthalate, also known as PET. This polymer is what makes plastic near unbreakable. It is strenuous to decompose PET because most bacteria cannot break it down. PET consists of long chains of repeating units of ethylene glycol and terephthalic acid, these are all linked by strong ester bonds. Ester bonds are extremely stable and require specific enzymes to break them down. Unfortunately most bacteria do not possess the amount of enzymes needed to break the bonds of PET.



PET
Polyethylene terephthalate
(C₁₀H₈O₄)_n

A perspective on an aspect of this issue (with a science informed response)

“There are practically no natural processes that can degrade plastic back into the ecosystem. Some people say plastic might break down after a few hundred years—but we don't know, because we haven't lived with plastic that long. It will stay with us, maybe forever.” - Winnie Lau.

This statement summarizes that the major issue in solving the problem is that plastic is near indestructible. The first few sentences of this perspective say that there are no natural processes that can fully degrade and decompose plastic. This statement is backing up why plastic isn't good for the environment because the person talks about the increase in production of plastics and how it can lead to infinite amounts of plastic on land and sea. The end of the statement summarizes the persons predictions on how long plastic will last for and why it is a problem for humans and possibly marine life.



Another key perspective that relates to the issue by a knowledge system other than science [Link](#)

“For Pacific Islands people, our cultures and ways of life have made protecting and preserving our natural environment of paramount value. Having learnt from generations past that in order to continue enjoying the benefits of our natural world, we must care for, and protect it so it provides for us and our future generations. To address an issue of such magnitude, we need an ambitious instrument that covers the full lifecycle of plastics and implements the aspiration of ‘sustainable’ production and consumption of plastics which we all espouse.”

These statements give us a perspective on marine plastic pollution from Islanders. This statement is essential because it speaks for most and on behalf of the people of the Pacific Islands. This shows that plastic pollution is a real problem for Islanders and there should be more things done to fix the problem and decrease the amount of plastic in not just oceans but also on land. Quoting the highlighted phrase, the Islanders refer to their culture and ways of life, this means that they often rely on marine life for food. Marine plastic pollution blocks the way of their culture by killing off the marine life because of deadly chemicals and misconception for food.

What can be done with a tiakitanga approach to this issue that would demonstrate guardianship?

Together as a community we can demonstrate tiakitanga by stopping the purchase of plastic and alternatively use recyclable materials like paper and cardboard. We must also ensure that we properly dispose of our waste instead of littering and remember the 3 r's - Reduce, reuse and recycle. This means that we dispose of waste in the waste bin and recyclable materials in the recycle bin, leaving smaller amounts of plastic in the ocean. Reusing a certain material as many times as you can is a great way to reduce the amount of plastic pollution in the ocean.

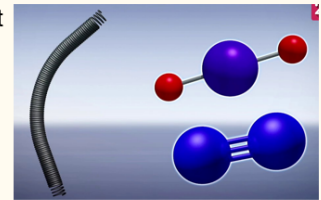


Give reasons for the science informed response that was taken to my issue, why it was taken and how it was related to both perspectives [Link](#)

Magnetic coils have been created by scientists, these scientific inventions are able to target microplastics in the ocean without doing any harm to marine life. These magnetic coils are coated in nitrogen and manganese, - which is a magnetic metal. When these elements react with oxygen molecules, they attach onto plastic and help break it down. It is shown that over a period of eight hours, the magnetic coils have between a 30-50% reduction rate for breaking down plastic.



I chose this science informed response because I felt like it was effective and had a great science idea going on. I like how the elements react with others to form an overall reaction. This can relate to the other perspectives above due to the fact that this can be a possible solution to fix the 'problems' that the different perspectives had. This solution can potentially fix the issue with the Islanders because magnetic coils do not harm marine life therefore not harming and affecting their source of intake. If this idea is considered by more people in the future then this can be a possible solution to reducing marine plastic pollution.



Why is it important for decision makers to consider more than one perspective when making a science-based response?

Decision-makers must consider multiple perspectives when making a science-based response because of many factors. The depletion of bias is essential because the decision-makers can consider just one view and neglect the others. By considering multiple perspectives, decision-makers can identify their preferences. Multiple perspectives can be used to make decisions that meet the needs of the interests of those affected.