Earth, Space, & Environmental Science
HONORS

Independent Learning Packet #9

Student Name: ______________________
Teacher: __________________________
Period: ___________________________

After completing the work in this packet, fill out the chart below.

<table>
<thead>
<tr>
<th>Concepts I understand well:</th>
<th>Concepts I’m still confused about:</th>
<th>Personal connections I can make to these concepts:</th>
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Plastics and the Ocean

Plastic is everywhere! It’s in your home, your school, your community, and your oceans. In 2017, the International Coastal Cleanup organization collected trash and was able to create the top 10 list of kinds of trashed collected during the event. Some of them included food wrappers, beverage bottles, grocery bags, straws, cigarette butts, straws, and take out containers, all made of plastic. How did all of these products end up in the ocean, and what can we do to solve the problem?

So exactly how much plastic is in the ocean? While it’s difficult to say exactly how much is out there floating around, scientists estimate that about 8 million metric tons of plastic end up in the ocean every single year. That’s about the same weight as 1 billion African Elephants! Humans started producing a lot of plastics around the year 1950. Researches found that by 2015, 79 percent of all the plastic created since is now in the natural environment.

Many plastic products are single-use items that are designed to be thrown out, like water bottles or take out containers. They are used and then thrown away quickly. If this plastic waste isn’t properly disposed of or managed, it can end up in the ocean. Since plastic doesn’t decompose, it can stick around indefinitely, wreaking havoc on marine ecosystems and the plant and animal life they support. Some plastics float once they enter the ocean, but others do not. As the plastic gets tossed around in the waves they break into much smaller pieces, which we call microplastics.

Most of the time, when you think of microplastics, you might think of the tiny plastic beads that are often times found in toothpastes or shampoos. However, microplastics are also created from larger plastic products as they get broken down in the ocean. Sadly, these smaller particles won’t just disappear. Microfibers, shed from synthetic clothing or fishing nets is another problematic form of microplastics. All of these smaller plastic fibers, beads, and microplastics are excellent absorbers of pollutants like pesticides, dyes, and other chemicals. When small fish or birds consume these small plastic particles, thinking they are food, those chemicals make their way into the food chain. Ultimately, you could be consuming very small plastic particles, as well as the pollutants they absorb and not even know it!
What can we do to help?

It's important to understand the impact that plastics have on our oceans, and how the land and the sea are connected. Plastics can be intentional littered or improperly disposed of, then entering the water via rain and winds. Plastic can get swept up and deposited into nearby bodies of water which ultimately spill out into the ocean. Streams and storm drains can carry debris directly into the ocean. In addition, fishing gear can become marine debris when it is lost or abandoned.

Once plastic enters the ocean, marine life can get caught and killed in fishing nets or larger plastic debris. The most common way plastics affect marine life, though, is when it is ingested. Animals can easily mistake plastic debris for food. Since plastic does not get digested once it enters an animals’ stomach, the plastic accumulates there. Eventually, if an animal consumes enough plastic, there isn’t room for food in the stomach. The animal slowly starves to death, with a full belly of plastic.

So what can we do to help address the massive amount of plastic that is plaguing our oceans? One way you can help is to reduce the amount of plastic products you depend on. Think about all the plastic products you use every day. Being more aware of how and why you use the plastic you do is the first step to reducing how much plastic you use. Try and reduce your use of disposable and single-use plastic items, reusing items, or recycling them. Instead of taking home groceries in plastic bags, use reusable shopping bags. Instead of buying water in plastic bottles, fill your washable and reusable water bottle up at home. If you do have to use plastic, find places where you can recycle it. In addition, volunteer to pick up marine litter in your local community. Every little step towards a cleaner ocean with less plastic helps!

Extra Facts:

1. There are five massive patches of plastic in the oceans around the world. These huge concentrations of plastic debris cover large swaths of the ocean; the one between California and Hawaii is the size of the state of Texas.
2. Every minute, one garbage truck of plastic is dumped into our oceans.
3. The amount of plastic in the ocean is set to increase tenfold by 2020.
4. By 2050 there will be more plastic in the oceans than there are fish (by weight).
5. The likelihood of coral becoming diseased increases from 4% to 89% after coming in contact with marine plastic. It also damages the skin of coral, allowing infection. Coral reefs are home to more than 25% of marine life.
1. _______ metric tons of plastic end up in the ocean every year.

2. It’s estimated that ____ percent of all the plastic every created is now in the natural environment.

3. Many plastic products are considered _______ use.

4. Plastic doesn’t _______________. It can stick around indefinitely.

5. Small pieces of plastic that have been broken by waves are called _________________.

6. Microplastics can be found in toothpaste or _________________.

7. _______________ from clothing or fishing nets is another form of microplastics.

8. Microplastics absorb _________________.

9. Marine animals can ______________ microplastics.

10. Microplastics can make their way into the _________________.

1. Plastic products that are discarded on land do not end up in our oceans.
   a. True
   b. False

2. Plastics can enter the ocean through _____.
   a. rain/runoff
   b. wind
   c. intentional littering
   d. all of the above

3. Storm drains can carry plastics directly into the oceans.
   a. true
   b. false

4. The most common way marine life is affected by plastic debris is getting tangled in it.
   a. true
   b. false

5. At this point, with so much plastic in the ocean, it’s impossible to make a difference in reducing the amount of plastic that ends up there.
   a. true
   b. false

6. Many marine organisms mistake microplastics for food.
   a. true
   b. false

7. How many massive plastic garbage patches exist in our oceans?
   a. two
   b. three
   c. four
   d. five

8. Every _____, one garbage truck of plastic is dumped into our oceans.
   a. minute
   b. day
   c. month
   d. year

9. The amount of plastic in the ocean is going to increase tenfold by the year _____.
   a. 2020
   b. 2030
   c. 2040
   d. 2050

10. By the year _____ there will be more plastic in the ocean than there are fish.
    a. 2020
    b. 2030
    c. 2040
    d. 2050

11. Coral reefs are extremely susceptible to death because of increased plastic pollution in the oceans.
    a. true
    b. false
In the space below, draw or explain how a plastic bag could start out at a grocery store, and end up in a marine animal’s stomach. Be sure to draw each and every step that could take place.

Please briefly describe each step.