6th Grade

History

COMMONLIT

Name: _____ Class: _____

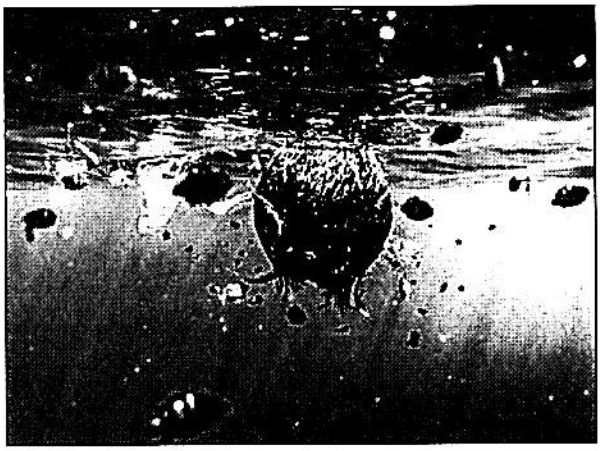
Tiny Plastic, Big Problem

Scientists find that tiny pieces of plastic travel great distances, threatening the ocean ecosystem

By Alison Pearce Stevens
2015

When plastic was invented at the turn of the 20th century, it was praised as a miraculous new material that could create countless products. Few could have predicted the impact that plastic would have on our world over the course of a century. As you read, take notes on the problems that plastic pollution presents and possible solutions mentioned in the text.

[1] Plastic bottles lying in the gutter. Grocery bags tangled in branches. Food wrappers scuttling across the ground on a windy day. Although such examples of litter easily come to mind, they only hint at the serious and growing problem of plastic pollution — a problem mostly hidden from view.



"Untitled" by Naja Bertolt Jensen is licensed under CC0.

The problem with plastics is they do not easily degrade. They may break down, but only into smaller pieces. The smaller those pieces get, the more places they can go.

Many pieces wind up at sea. Tiny bits of plastic float throughout the world's oceans. They wash up on remote[1] islands. They collect in sea ice thousands of kilometers[2] from the nearest city. They even meld with rock, creating a whole new material. Some scientists have proposed calling it plastiglomerate (pla-stih-GLOM-er-ut).

Exactly how much plastic is out there remains a mystery. Scientists are hard at work trying to find out. So far, though, experts haven't found as much plastic floating in the oceans as they expected. All that missing plastic is worrisome, because the smaller a plastic bit becomes, the more likely it will make its way into a living thing, whether a tiny plankton or an enormous whale. And that may spell some real trouble.

Into the soup

[5] Plastics are used to make countless everyday products — from bottles to auto bumpers, from homework folders to flowerpots. In 2012, 288 million metric tons (317.5 million short tons) of plastic were produced worldwide. Since then, that amount has only grown.

1. **Remote** ***(adjective)*** far away from the main population; distant or isolated
2. One kilometer equals about 0.6 miles.

Just how much of that plastic winds up in the oceans remains unknown: Scientists estimate about 10 percent does. And one recent study suggests as much as 8 million metric tons (8.8 million short tons) of plastic wound up in the ocean in 2010 alone. How much plastic is that? "Five plastic bags filled with plastic for every foot of coastline in the world," says Jenna Jambeck. She's the researcher from the University of Georgia, in Athens, who led the new study. It was published February 13 in *Science*.

Of those millions of tons, as much as 80 percent had been used on land. So how did it get into the water? Storms washed some plastic litter into streams and rivers. These waterways then carried much of the trash downstream to the sea.

The other 20 percent of plastic ocean trash enters the water directly. This debris includes fishing lines, nets and other items lost at sea, dumped overboard or abandoned when they become damaged or are no longer needed.

Once in the water, not all plastics behave the same way. The most common plastic — polyethylene terephthalate (PAHL-ee-ETH-ill-een TEHR-eh-THAAL-ate), or PET — is used to make water and soft-drink bottles. Unless filled with air, these bottles sink. This makes PET pollution tough to track. That's especially true if the bottles have drifted to the ocean depths. Most other types of plastic, however, bob along the surface. It's these types — used in milk jugs, detergent bottles and Styrofoam — that make up the abundance of floating plastic trash.

[10] Abundant, indeed: Evidence of plastic pollution abounds across the world's oceans. Carried by circular currents called gyres (JI-erz), discarded pieces of plastic can travel thousands of kilometers. In some areas, they amass in huge quantities. Reports on the largest of these — the "Pacific Garbage Patch" — are easy to find online. Some sites report it to be twice the size of Texas. But defining the actual area is a difficult task. That's because the garbage patch is actually quite patchy. It shifts around. And most of the plastic in that area is so tiny that it's hard to see.

Millions of tons... gone missing

Recently, a group of scientists from Spain set out to tally just how much plastic floats in the oceans. To do so, the experts traveled the world's oceans for six months. At 141 locations, they dropped a net into the water, dragging it alongside their boat. The net was made of very fine mesh. The openings were only 200 micrometers (0.0079 inch) across. This allowed the team to collect very small bits of debris.[3] The trash included particles called *microplastic*.[4]

The team picked out the plastic pieces and weighed the total found at each site. Then they sorted the pieces into groups based on size. They also estimated how much plastic might have moved deeper into the water — too deep for the net to reach — due to wind churning up the surface.

What the scientists found came as a complete surprise. "Most of the plastic is lost," says Andrés Cózar. This oceanographer[5] at the Universidad de Cádiz in Puerto Real, Spain, led the study. The amount of plastic in the oceans should be on the order of millions of tons, he explains. However, the collected samples lead to estimates of just 7,000 to 35,000 tons of plastic floating at sea. That's just one-hundredth of what they had expected.

3. **Debris** *(noun)* scattered pieces of waste or remains
4. A small piece of plastic, 5 millimeters or smaller in size. Microplastics may have been produced at that small size, or their size may be the result of the breakdown of water bottles, plastic bags or other things that started out larger.

Most plastic that Cózar's team fished out of the seas was either polyethylene or polypropylene. These two types are used in grocery bags, toys and food packaging. Polyethylene is also used to make microbeads. These tiny plastic beads can be found in some toothpastes and facial scrubs. When used, they wash down the drain. Too small to be trapped in filters at wastewater treatment plants, microbeads continue to travel into rivers, lakes — and eventually down to the sea. Some of this plastic would have been too small to have been caught in Cózar's net.

[15] Most of what Cózar's group found were fragments broken from larger items. That comes as no surprise.

In the oceans, plastic breaks down when it's exposed to light and wave action. The sun's ultraviolet (UV) rays weaken the otherwise strong chemical bonds within the plastic. Now, when waves smash the chunks against each other, the plastic breaks into smaller and smaller pieces.

When the Spanish team began sorting its plastic by size, the researchers expected to find larger numbers of the very smallest pieces. That is, they figured that most of the plastic should have been tiny fragments, measuring just millimeters (tenths of an inch) in size. (The same principle applies to cookies. If you were to smash a cookie, you would wind up with many more crumbs than you would large pieces.) Instead, the scientists found fewer of these tiny bits of plastic.

What had happened to them?

Entering the food web

Cózar proposes several possible explanations. The tiniest bits might have broken down quickly into particles too small to catch in his net. Or maybe something caused them to sink. But a third explanation seems even more likely: Something ate them.

[20] Unlike the organic matter found in living things, plastics do not provide energy or nutrients[6] to growing animals. Still, critters do eat plastic. Sea turtles and toothed whales gulp down plastic bags, mistaking them for squid. Sea birds scoop up floating plastic pellets, which can resemble fish eggs. Young albatross have been found dead from starvation, their stomachs full of plastic garbage. While feeding, adult seabirds skim floating trash with their beaks. Parent birds then regurgitate[7] the plastic to feed their young. (These plastic bits eventually can kill them.)

Yet such large animals wouldn't eat pieces just millimeters in size. Zooplankton might, however. They are much smaller marine[8] creatures.

"Zooplankton describe a whole range of animals, including fish, crab and shellfish larvae," explains Matthew Cole. He is a biologist at the University of Exeter in England. Cole has found that these tiny critters are just the right size to snap up the millimeter-size bits of plastic.

5. Someone who works in the field of oceanography, or the branch of science that deals with the physical and biological properties and phenomena of the oceans.
6. vitamins, minerals, fats, carbohydrates and proteins that are needed by organisms to live and comes mainly from one's diet
7. to vomit or throw up
8. having to do with the ocean or sea

His research team has collected zooplankton from the English Channel. In the lab, the experts added polystyrene beads to tanks of water holding the zooplankton. Polystyrene is found in Styrofoam and other brands of foam. After 24 hours, the team examined the zooplankton under a microscope. Thirteen of the 15 zooplankton species had swallowed the beads.

In a more recent study, Cole found that microplastics limit the ability of zooplankton to consume food. Zooplankton that had swallowed polystyrene beads ate smaller bits of algae. That cut their energy intake nearly in half. And they laid smaller eggs that were less likely to hatch. His team published its findings January 6 in *Environmental Science & Technology*.

[25] "Zooplankton are very low on the food chain," Cole explains. Still, he notes: "They are a really important food source for animals like whales and fish." Reducing their population could have a widespread impact on the rest of the ocean ecosystem.

And, it turns out, not just tiny zooplankton are eating the plastic bits. Larger fish, crabs, lobster and shellfish do too. Scientists have even found plastic in the guts of marine worms.

Once there, the plastic tends to stick around.

In crabs, microplastics remain in the gut six times longer than food does, says Andrew Watts. He is a marine biologist[9] at the University of Exeter. What's more, eating plastic causes some species, such as marine worms, to store less fat, protein and carbohydrate, he explains. When a predator (such as a bird) now eats those worms, it gets a less nutritious meal. It also ingests the plastic. With each meal consumed, more and more plastic makes its way into a predator's body.

That's cause for concern. "Plastics might pass up the food chain," says Cole, "until it gets into food that ends up on our own dinner plates."

An accumulating problem

[30] The thought of eating plastic isn't pleasant. But it isn't just the plastic that's cause for concern. Scientists also worry about a variety of chemicals found on the plastic. Some of those chemicals come from the manufacturing process, explains Kara Lavender Law. She is an oceanographer at the Sea Education Association in Woods Hole, Mass.

Plastics also attract a variety of dangerous pollutants,[10] she notes. That's because plastic is hydrophobic — just like oil, it repels water.

But plastic, oil and other hydrophobic substances are attracted to each other. So oily contaminants tend to glom onto pieces of plastic. In a way, plastic acts like a sponge, soaking up hydrophobic contaminants. The pesticide DDT[11] and polychlorinated biphenyls (or PCBs) are two such toxic[12] contaminants that have been found in ocean-going plastics.

9. A marine biologist is a scientist who studies creatures that live in ocean water, from bacteria and shellfish to kelp and whales.
10. a substance that poisons something — such as the air, water, soil, products, and living beings
11. short for dichlorodiphenyltrichloroethane
12. **Toxic** *(adjective)* containing poisonous substances

Even though both contaminants have been banned for decades, they are slow to break down. So they persist in the environment. To this day, they hitch a ride on trillions of pieces of plastic floating in the oceans.

One reason these contaminants were banned is because of the way they affect animals and people. When eaten, the chemicals work their way into an animal's tissues. And there they stay. The more of these chemicals a critter consumes, the more that gets stored in its tissues. That creates a constant exposure to the pollutants' toxic effects.

[35] And it doesn't stop there. When a second animal eats that first critter, the contaminants move into the new animal's body. With each meal, more contaminants enter its tissues. In this way, what had started as trace amounts of a contaminant will become increasingly concentrated as they move up the food chain.

Whether contaminants hitching a ride on plastic work their way into the body tissues of marine animals in the same way remains unknown. But scientists are concerned that they might. Just how much of these chemicals in marine organisms came from eating contaminated plastic and how much from eating contaminated food is a big question, says Law. And no one yet knows whether the problem affects people.

Managing microplastics

The very nature of microplastics makes cleanup impossible. They are so tiny and so widespread that there is no way to remove them from the seas, notes Law.

The best solution is to prevent more plastic from reaching the ocean. Trash traps and litter booms can snag garbage before it enters waterways. Even better: Reduce plastic waste at its source. Be aware of packaging and buy items that use less of it, Law suggests. Skip the plastic bags, including zippered ones used for foods. Invest in reusable water bottles and lunch containers. And say no to straws.

Law also recommends asking restaurants to stop using polystyrene foam containers. These break up quickly and are not recyclable. Talk to friends and parents about the problems of plastic, and pick up litter when you see it.

[40] Law recognizes that reducing plastic use won't be an easy change. "We live in an era of convenience," she says. And people find it convenient to throw things away when they are done with them.

That's not to say that we should do away with plastic altogether. "Plastic has a lot of beneficial uses," says Law. But people need to stop looking at plastic as disposable, she argues. They need to view plastic items as durable things to hold on to and reuse.

Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. In your own words, summarize the central ideas of this article.

2. What is the purpose of paragraph 1?
   A. to make readers curious about the "hidden" pollution
   B. to introduce the topic of pollution on the ground and in trees
   C. to argue that pollution on land is a more serious problem than pollution in the ocean
   D. to claim that pollution is becoming harder to see because people are ignoring it

3. Based on the information in paragraph 4, what is the likely reason why experts have found less plastic floating in the ocean than they expected? Cite evidence from the text.

4. PART A: As it is used in paragraph 10, the word "abundant" most closely means —
   A. dangerous.
   B. minimal.
   C. challenging.
   D. widespread.

Music

20th Century Pop Music

Band Music

Beginning in the latter part of the 1800s, band concerts became wildly popular, particularly in the early 20th century, as a form of casual entertainment. They consisted of transcriptions of orchestral music, arrangements of popular tunes of the day, accessible original pieces composed for band, and, most importantly, marches.

Jazz

Jazz is a form of popular music that began its development around the turn of the century. Jazz can be distinguished by many characteristics, but two of the most prominent traits are the heavy use of syncopation and the frequent employment of improvisation in performance.

One of the earliest and most important jazz-influenced genres was ragtime, which had its origins in African-American spirituals, European marches, and the minstrel show music of the 19th century. The most famous ragtime composer was Scott Joplin (1868–1917).

In addition to ragtime, another primary source of jazz was the blues. The blues was rooted in African-American field hollers, work songs, and spirituals of the rural southern United States. The blues was a form of vocal music based on sad subjects, sometimes about love or life crises. "Jelly Roll" Morton (1890–1941) was a well-known blues pianist who performed across the southern United States.

In New Orleans, Louisiana, in the southern United States, a prominent jazz style developed during the 1920s and 1930s. Influenced by the blues and ragtime, a rich local brass band came together to create a new type of music called Dixieland jazz. The music of trumpeter and singer Louis Armstrong (c. 1898–1971) was highly influential in developing jazz music. Some other well-known Dixieland musicians were trumpeter Bix Beiderbecke, trombonist Edward "Kid" Ory, clarinetist Sidney Bechet, and bandleader and trumpeter King Oliver.

Jazz music evolved throughout the 20th century and is still popular today. In the 1930s and 1940s, "big bands," usually consisting of ten players or more, played dance music called "swing." Swing became very popular with young people throughout the United States and Europe. It was performed in a triplet swing rhythm style. Two of the prominent early big band leaders were Fletcher Henderson and Paul Whiteman. The big band boom of the 1930s and 1940s brought together the greatest jazz musicians of the day to play with bands led by prominent big band leaders such as clarinetist Benny Goodman, trombonist Tommy Dorsey, saxophonist Jimmy Dorsey, trombonist and arranger Glenn Miller, clarinetist and saxophonist Woody Herman, pianist and composer Duke Ellington, and pianist Count Basie. Stan Kenton (1911–1979) was the leader of a succession of different big bands. Thad Jones (1923–1986) was a cornetist, flugelhorn player, composer, and bandleader whose works have become big band classics. Jazz singers during the big band era included Billie Holiday, Ella Fitzgerald, Frank Sinatra, Bing Crosby, and Joe Williams.

Rock

Rock music grew out of the rich tradition of American popular music, especially the blues. The evolution started when blues music migrated from rural areas to cities. The development continued after World War II, when blues bands added an electric guitar and bass. Players of these new instruments, along with those playing drums, piano, saxophones, and brass, joined vocalists to perform an urban style of blues which eventually came to be known as rhythm and blues. Another developing style of the period was country music, which also developed from the blues. Elvis Presley combined rhythm and blues with country in the new wildly popular genre of rock and roll in the 1950s.

Rock and roll in the 1960s developed into a music style simply called "rock." Rock was different from rock and roll; it had a freer form, more electric amplification and distortion of sound, and offered more room for improvisation. As rock evolved in the late 20th century, music became a platform to reflect social causes, personal history, and political viewpoints, and it also encompassed a variety of styles and performance methods that include reggae, progressive rock, heavy metal, hip hop, and rap. The Rolling Stones and The Beatles particularly echoed the blues and R&B sound. The band U2 from Dublin, Ireland, frequently coupled their activism in human rights and social justice issues with a music style that reflected a technological edge even while embracing their rock and roll roots.

20th Century Pop Music

1. Name one important composer or performer in each of the following 20th century pop music styles.

   a. Ragtime

   b. Blues

   c. Dixieland

   d. Big Band

   e. Swing

   f. Rock

2. Band music became widely popular starting in the latter part of which century?

3. Name the most famous ragtime composer.

4. The blues were rooted in which styles of African-American music?

5. What style of music is associated with "big bands"?

6. How was "rock" music different than "rock and roll"?

7. The 20th century, beginning to end, became the greatest transitional period for music to date.

   ☐ True ☐ False

English

6th ELA
Digital Learning Day Assignment
April 2, 2021

Your assignment directions should be straightforward and easy to follow.

1. Take home your Lumos Learning workbook.

2. Read and complete the questions on pages 17-31. Simply fill in the bubbles with your answers and bring your book back to school on Tuesday.

3. If you are a remote learner, please submit your answers through a Google Doc and attach it to this assignment that is posted in Google Classroom. You may number your answers from 1-13, and then 1-10 for the second section.

4. I will be available if you have any questions. My e-mail is kdewey@kings144.org.

Math

6.NS.8: Worksheet

1. Plot the points $(1,2)$, $(-2,-5)$, $(0,-7)$ on the coordinate plane.

2. How far apart are $(10,8)$ and $(-6,8)$?

3. How far apart are $(-4,-6)$ and $(-4,13)$?

4. How far apart are $(1,2)$ and $(-1,2)$?

5. How far apart are $(0,-1.5)$ and $(0,9.5)$?

6. Refer to Figure 1. Which points are exactly 3 units apart?

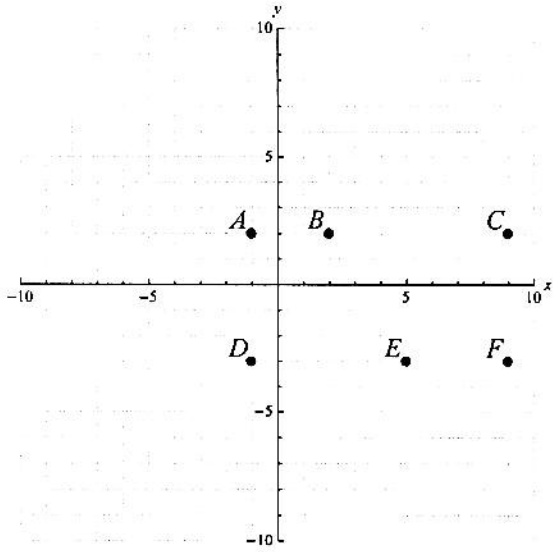


Figure 1.

7. Refer to Figure 1. Which points are exactly 5 units apart?

8. Refer to Figure 1. Which points are exactly 6 units apart?

9. Of the labeled points in Figure 1, which is exactly 7 units from $(9,4)$ and 12 units from $(-3,-3)$?

10. Of the labeled points in Figure 1, which is exactly 3 units from $(5,2)$ and 9 units from $(2,-7)$?

Science

Name _____ Date _____ Class _____

The Air Around You

Understanding Main Ideas

Fill in the blanks in the table below.

Gases in Dry Air	Percent by Volume
Argon	1. _____
2. _____	0.038
Nitrogen	3. _____
4. _____	21

Answer the following questions on a separate sheet of paper.

5. Besides the gases shown in the table, what else is found in Earth's atmosphere?
6. What are two sources of carbon dioxide in air?
7. What are trace gases?
8. How does the atmosphere make conditions on Earth suitable for living things?
9. What are two processes that use oxygen?
10. Is the atmosphere always the same? Explain why or why not.

Building Vocabulary

Match each term with its definition by writing the letter of the correct definition on the line beside the term.

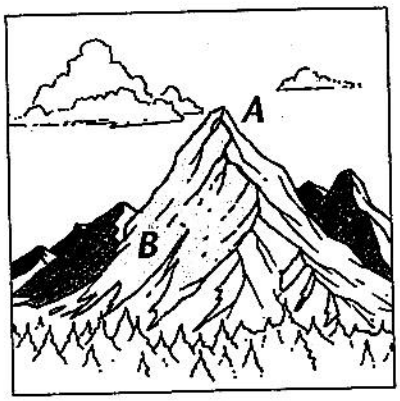
____ 11. weather
____ 12. atmosphere
____ 13. ozone
____ 14. water vapor

a. the envelope of gases that surrounds Earth
b. a form of oxygen that has three oxygen atoms in each molecule instead of the usual two
c. water in the form of a gas
d. the condition of Earth's atmosphere at a particular time and place

Air Pressure

Understanding Main Ideas

Study the figure below, and then complete the following statements.



1. Altitude is greater at point _____.
2. Air pressure is greater at point _____.
3. Density of the air is greater at point _____.
4. A cubic meter of air has less mass at point _____.
5. The percentage of oxygen in the air at point A is about _____ percent.
6. State three properties of air.

_____

7. Why doesn't air pressure crush objects such as your desk?

_____

8. What two units of air pressure are commonly used in weather reports?

_____

Building Vocabulary

Match each term with its definition by writing the letter of the correct definition on the line beside the term.

____ 9. air pressure	a. the amount of mass in a given volume of air
____ 10. altitude	b. force pushing on an area or surface
____ 11. aneroid barometer	c. the result of the weight of a column of air pushing down on an area
____ 12. barometer	d. any instrument that measures air pressure
____ 13. density	e. instrument that measures air pressure using liquid mercury
____ 14. mercury barometer	f. the distance above sea level
____ 15. pressure	g. instrument that measures air pressure without using a liquid

PE/Health

4/2/21 Digital Learning Day PE

Today I would like you to take a walk outside. While you are walking I want you to look for the following items. It is ok if you don't find everything, if you see something neat that is not on the list write it down.

Cloud

Worm

Bike

Fence

Red car

Trash can

Mailbox

Flag

Basketball hoop

Pinecone

Street sign

Anything else you saw?