

Understanding Pollution: After Learning about Particulate Matter You'll Never Think Of Breathing the Same Again

I recently moved to China to teach English as a second language, and on my first day here I walked out of my apartment, and saw people wearing surgical masks. I was quite confused as to why, and decided to ask someone. I was told that many people in China wear surgical masks in order to protect themselves from air pollution, and particularly from particulate matter. Now, I knew that pollution in China was bad; all I had to do was look out my window to see the smog that hung perpetually over the city, but I had no idea what particulate matter was, so I decided to investigate.



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Particulate matter is the word used to describe the extremely tiny solid particles and liquid droplets that are in the air.ⁱ These particles and droplets are so tiny that many thousands of them could fit on the end of the period following this sentence.ⁱⁱ You may be thinking “why am I worried about something so small?” Well, because they are that small they are able to pass through our noses and throats and into our lungs where they will impact both your heart and lungs as time passes.ⁱⁱⁱ The particles are not made up of just one type of chemical, but many hundreds of different chemicals.^{iv} The reason for that diversity is the sources of particulate matter are quite diverse themselves. There are two categories of particulate matter. Coarse particles are those that are from manmade sources, and fine particles are naturally occurring in nature or created when particles mix in the air.^v They include power plant emissions, industrial manufacturing emissions, and fuel

combustion from automobiles, simple fires, and wood burning stoves.^{vi} Those are the just some of the sources of coarse particles. Fine particles, as mentioned before, occur either naturally, such as from forest fires, or are created when the particles mix in the air.

Now, I mentioned earlier that these particulate matters are small enough to enter our lungs, but what effect do they have once there? To begin with they can simply irritate your lungs and increase the permeability, or amount of air let into and out of, your lungs.^{vii} They also cause irregular heartbeats which can lead to non-fatal heart attacks, and fatal heart attacks, and in people with heart or lung disease they can kill you.^{viii} Other effects include aggravated asthma, decreased ability of your lung's to function, coughing, irritation of your airways, and difficulty breathing.^{ix} It is believed that if tighter guidelines were in place to regulate how much particulate matter is released into the air that 15000 lives a year would be saved, and that thousands of hospital visits by the elderly and those with already suffering from lung and heart disease could be avoided.^x Think about that. 15000 deaths annually, and tens if not hundreds of thousands of dollars in hospital costs saved every year. I know lives and money aren't even close to the same categories, but both have immense value. That money could go to boosting the economy in a myriad of different ways, and those people could go on to cure cancer! Finally, like so much else in this polluted world in which we live, particulate matter can cause a drop in your body's ability to fight off infections, bacteria, and viruses.^{xi} I begin to understand why I see so many people here in Xi'an, China wearing surgical masks.



Particulate matter also has a major effect on the environment. I remember when I was a kid visiting my grandparents in Tennessee, and my dad took my hiking in the Appalachians. From the top of those mountains I felt like I could see forever. As I grew older, I naturally realized that I was seeing for miles, and not forever, but that is the magic of childhood. As it turns out one of the greatest impacts of particulate matter on the environment is that it reduces visibility. In the eastern half of the United States on a clear day you used to be able to see up to 90 miles away, but now due to particulate matter that visibility has been reduced to between 14 and 24 miles.^{xii} That's a 70% reduction in visibility so just imagine how much crud is in the air. Particulate matter also increases the acidity level of lakes and rivers, and changes the nutrient balances in coastal waters and rivers.^{xiii} A truly scary thought is that particulate matter is also damaging enough to cause visible damage to stone and other manmade structures.^{xiv} Something strong enough to damage stone is going into our lungs?

Well, I set out with the goal of trying to find out why everyone I saw was wearing surgical masks, and I should say mission accomplished. But, me being me, my mind is kind of racing right now. I wonder why there aren't more people talking about this, and why something so damaging to both human health, and the environment is so little known. I didn't grow up in the city seeing smog every day of my life. I grew up seeing the woods and hills around my house. I didn't know what air pollution was until I learned about it in school, and I didn't truly appreciate the dangers of pollution until I got to China. Now I do, and I ask myself why we allow our beautiful world to be destroyed. I want to be able to take any future children I have back to the top of the Appalachians and have them get that same feeling of seeing forever, but I don't know if I'll get the chance. The very air that we breathe, that is essential for human life is becoming toxic to us. That thought terrifies me. Yes, you can buy surgical masks for when you go outside. You can even buy indoor air filters for your homes like my parents have, and you should. Your health is important, but why does the need for these things exist? What happened to this world that has so nurtured us for millennia? Mankind happened, and we're the only ones who can fix it.

About the Author



Dominick Principe is a graduate of Rowan University with dual Bachelor Degrees in Elementary Education and Writing Arts. He is a prolific reader who devours any book put before him, and feels that life is one great long book without an end. He fills his hours constantly exploring new information, and seeking to educate himself in the ways of the world. He puts all of that knowledge and his passion for learning to good use teaching English as a second language to students of all ages. When his nose isn't buried in a book, or in class teaching, then he can generally be found typing away at his computer working on some random piece of writing that he was inspired to do.

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- ^{xiv} "Particulate Matter." *EPA*. Environmental Protection Agency. Web. 25 Nov. 2014. <<http://www.epa.gov/airscience/air-particulatematter.htm>>.