THE PITTSBURGH AIR POLLUTION PROBLEM:

By Emma Maurice

DO YOU REALLY KNOW WHAT'S IN THE AIR YOU BREATHE?

INSIDE

The Air We Breathe

On average, humans inhale between eight to ten liters of air each day. Yet in addition to oxygen, we may also be inhaling harmful substances in the atmosphere in either liquid, solid, or gaseous forms — known as air pollution — which places human health, the environment, and wildlife all at harmful risk.

While pollutants are commonly present in urban environments, they can be reduced through the public's actions to minimize personal emissions, by advocating for officials who care about reducing emissions, and by supporting clean air organizations who are fighting for industries to abide by the Clean Air Act.

Pittsburgh's Hazy Past

Once known as the “Smoky City,” Pittsburgh was a growing hub for large industries due to its prime location and natural resource endowments, inevitably creating a pollution problem due to the lack of environmental control of the air quality. An article from “Popular Pittsburgh” thoroughly depicts the history and development of air pollution in Pittsburgh. Beginning in 1762, a coal seam was discovered along the south bank of the Monongahela River; the extractive industry of coal mining resulted in the most prominent and longest lasting impact on the Pittsburgh environment — smoke pollution.

Efforts began to reduce air pollution in the 1800s, but were rarely enforced by the evident lack of proper regulations and control technologies. Residents were unable to be convinced that the smoke was a problem; many believed the smoke was a sign of productivity and prosperity.

Darkness eventually consumed Pittsburgh at all hours of the day by the 1940s. This prompted a 1946 promise by mayor David L. Lawrence to clean up and beautify the city. The twenty-year redevelopment effort drastically improved the air quality in the city — seeing a 90% decrease in smoke pollution in 1954 — through using new sources of energy. Eventually, the collapse of the iron and steel industries in the 1980s significantly improved the air quality in Pittsburgh. The skies were clearing and the skyline could be seen once again.

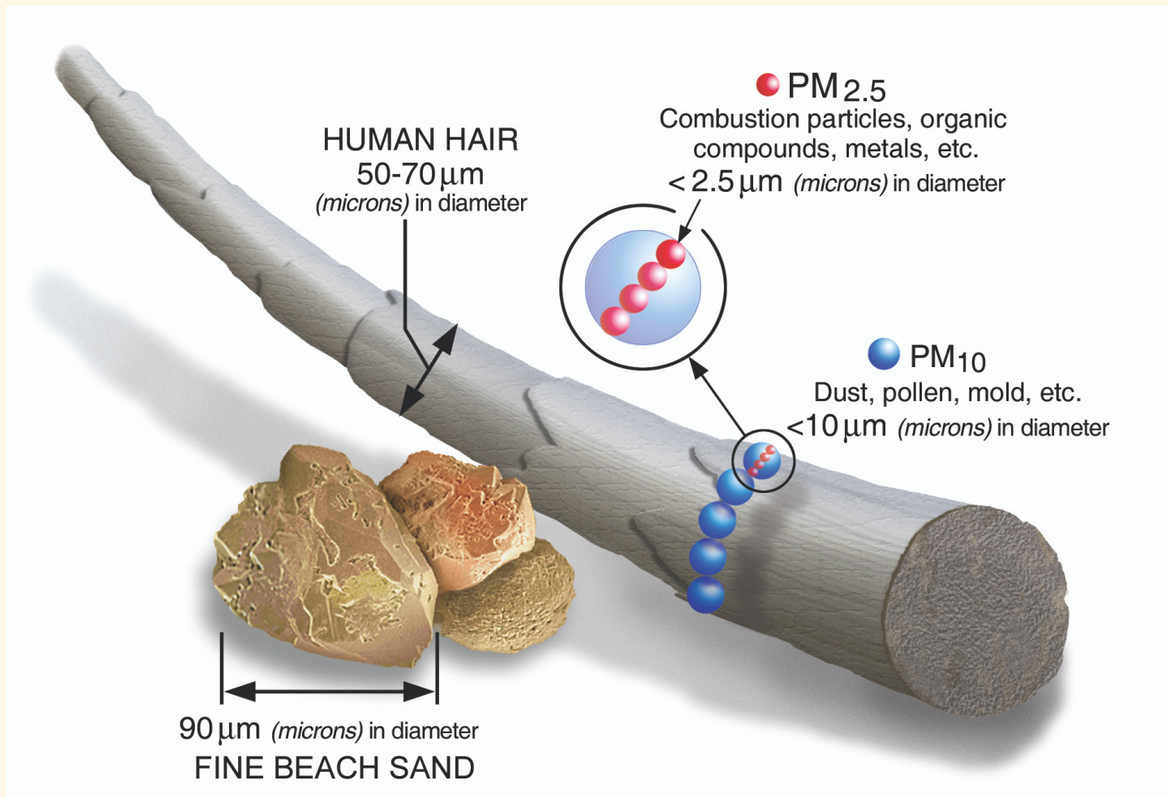
Corner of Liberty and Fifth Ave
at 8:38 am (left) and 12 noon (right) in the 1940s

Today, the Pittsburgh region is consistently ranked as one of the worst counties for air pollution by the American Lung Association in their State of the Air reports. The city claims the position of 8th worst in the country for annual measures of particle pollution, and 14th worst for short-term particle pollution. Also ranking 26th worst in the country for smog from ground level ozone, The Pittsburgh region still has a ways to go if there is going to be any positive change.

Understanding Pittsburgh's Air Pollution

According to the United States Environmental Protection Agency (EPA), current pollution levels in many areas of the United States exceed national air quality standards for at least one of the following six pollutants: particle pollution, ground-level ozone pollution, sulfur dioxide, nitrogen dioxide, lead, and carbon monoxide. The Pittsburgh region, which consists of Western Pennsylvania and small portions of West Virginia and Ohio, suffers primarily from both short-term and long-term particle pollution — or fine particulate matter — and ground-level ozone pollution.

While the Pittsburgh skyline may look blue and clear on sunny days, fine particulate matter, also known as PM2.5, hides in Pittsburgh's air. PM2.5 defines particles with a diameter of 2.5 microns or less. Emitted into the air from fires, vehicle emissions, power plants, or heavy industry, PM2.5 is deemed more harmful to health than PM10, as the size of the smaller particles allows them to be inhaled deeper into the lungs. These fine particles can also remain suspended in the air and have the ability to travel great distances, which could explain the high levels of remote air pollution the Pittsburgh region suffers from. In addition, the nitrogen oxides emitted from vehicles are capable of reacting with Volatile Organic Compounds — gasses from certain solids or liquids — on sunny days, leading to the formation of ground level ozone.



Nancy Goodes, the Clean Air for Pittsburgh organizer for PennEnvironment — a grassroots environmental advocacy organization — explained in an interview that the air quality in Pittsburgh varies from day to day. The quality of each day depends on different factors characterizing that day, such as how warm the temperature is or certain environmental factors — such as weather — which can increase or decrease how polluted the air is that we breathe.

PennEnvironment
Clean air. Clean water. Open spaces.

Nancy Goodes
Clean Air for
Pittsburgh organizer

Understanding Pittsburgh's Air Pollution

According to Goodes, “Depending on how much cars or industrial plants are polluting that day may increase or decrease the particulate matter in the air ... Our [2016] "Trouble in the Air" report found that one out of three days here in Pittsburgh, we are breathing in air that is at unhealthy levels.”

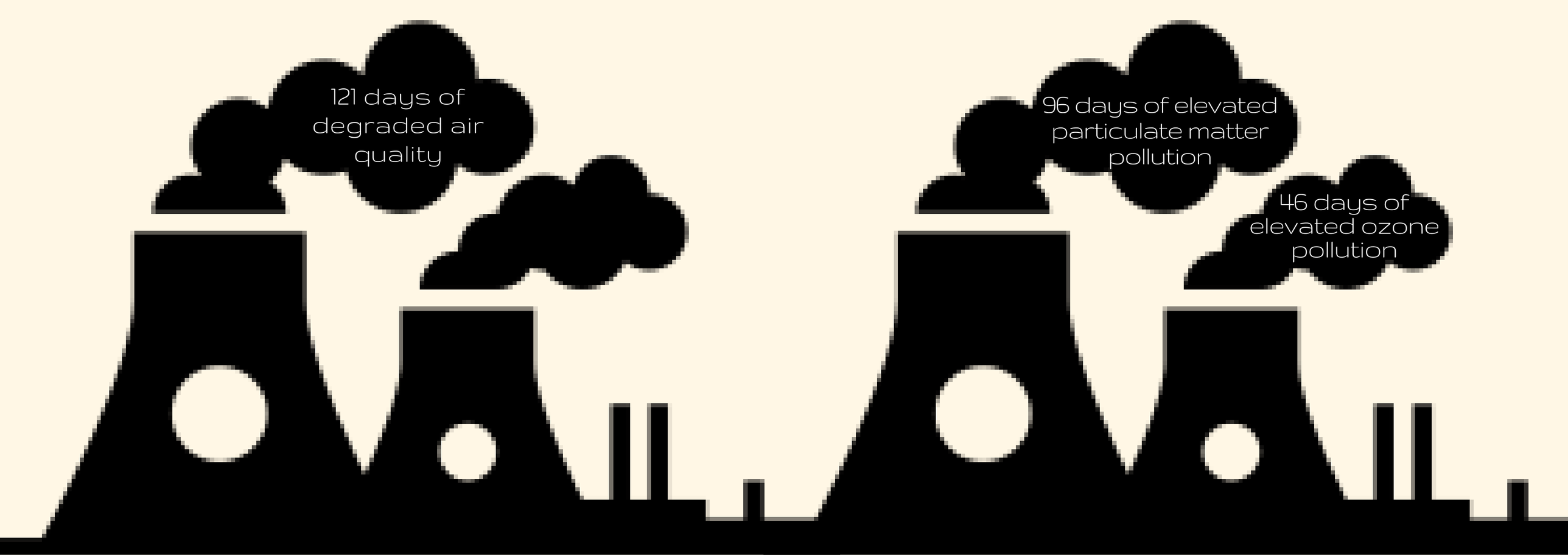
The PennEnvironment’s "Trouble in the Air" report shows one out of every three days equals out to 121 days of degraded air quality in Pittsburgh, with elevated levels of particulate matter and ozone pollution. Thus, Pittsburgh is experiencing four months per year where air pollution is above the EPA's level of presenting “little to no risk” to human health.

> “ONE out of THREE days here in Pittsburgh, we are breathing in air that is at UNHEALTHY LEVELS.”

A further breakdown of these numbers shows that in 2016 Pittsburgh experienced 46 days of specifically elevated ozone pollution, and 96 days of elevated levels of particulate matter pollution. In fact, the Environmental Health News states, “The only metropolitan areas with more days of elevated air pollution than Pittsburgh that year were Los Angeles and San Bernardino in California, and Las Vegas.”

The organization’s "Toxic Ten" report also showed that 70% of Pittsburgh’s air pollution comes from industrial sources, such as chemical and industrial plants. Included in those ten is the Cheswick Generating Station, a coal-fired power plant site along the Allegheny River — named the number one most polluting facility.

While the majority population tends to place most blame on the transportation sector, the most prominent cause is these large industrial plants.



Allegheny's Industries

Because of Allegheny's mass concentration of industrial polluters, it has some of the worst air pollution in the country.

According to the Environmental Health News (EHN), in 2016, the Cheswick Generating Station was responsible for emitting over 300 pounds of arsenic and 200 pounds of chromium into the air, along with lead, manganese, mercury, and other toxic pollutants. In fact, PennEnvironment's Toxic Ten report lists the facility as the largest emitter of nitrogen oxides and sulfur dioxide in the county, the largest emitter of lead and mercury, and one of the top five largest sources of benzene and carbon monoxide — with over 30,000 people living within three miles of the plant.

Cheswick Generating Station,
seen from a nearby neighborhood

The number 2 and number 3 most polluting facilities in our country — ATI Flat Rolled Products plant in Brackenridge, a stainless-steel plant, and Clairton Coke Works, which provides fuel for a nearby steel furnace — both have major issues with their air quality permits. Thus, both plants should not be allowed to emit and the Allegheny Health Department must enforce this.

ATI emits sulfur oxides, carbon monoxide, and a multitude of other harmful pollutants, yet has never been issued an air quality permit. Whereas Clairton, which has been operating under an expired air quality permit since 2012, emits such high levels of heavy metals and other pollutants that the Allegheny County Health Department concluded that in 2017, the plant had violated air pollution standards about 6,700 times in the former three and a half years. A little under 20,000 people are living within three miles of ATI and over 36,000 within three miles of Clairton — placing these thousands of lives at even higher risk than anyone outside of the close mile radius.

ATI Flat Rolled Products
Brackenridge, PA

Clairton Coke Works

Asthma-Spurring Pollution

In fact, according to the EHN, children attending an elementary school 15 miles south of Pittsburgh have nearly double the asthma rates of Pennsylvania children — which researchers attribute to the continuous toxic air pollution from the nearby Clairton industry.

Researchers tested 213 children from Clairton Elementary School — finding that 18.4% of them had asthma. According to Dr. Deborah Gentile, a Pittsburgh pediatrician and a member of the Pediatric Alliance, this is higher than the Pennsylvania state average of 10%.

The most shocking finding of this study — the researchers' testing actually diagnosed 15% of the children with asthma for the first time, with 15% of these children living unknowingly with untreated asthma. Of the children tested, 64% had "poorly controlled" asthma, according to Gentile, which means they weren't receiving adequate medicine to help control the disease. The Pennsylvania average for children with uncontrolled asthma? About 27%.

The EHN names asthma as the nationwide leading cause of absenteeism among elementary school students because of lost sleep from wheezing or ER visits due to asthma attacks. At Pittsburgh Public Schools, about a quarter of students attending in 2011-2012 were chronically absent, or missed at least 18 school days. Based off of an analysis from multiple studies published by Education Week — chronic absenteeism was shown to negatively impact students' learning and achievement capabilities, in addition to contributing to social, emotional, and behavioral issues.

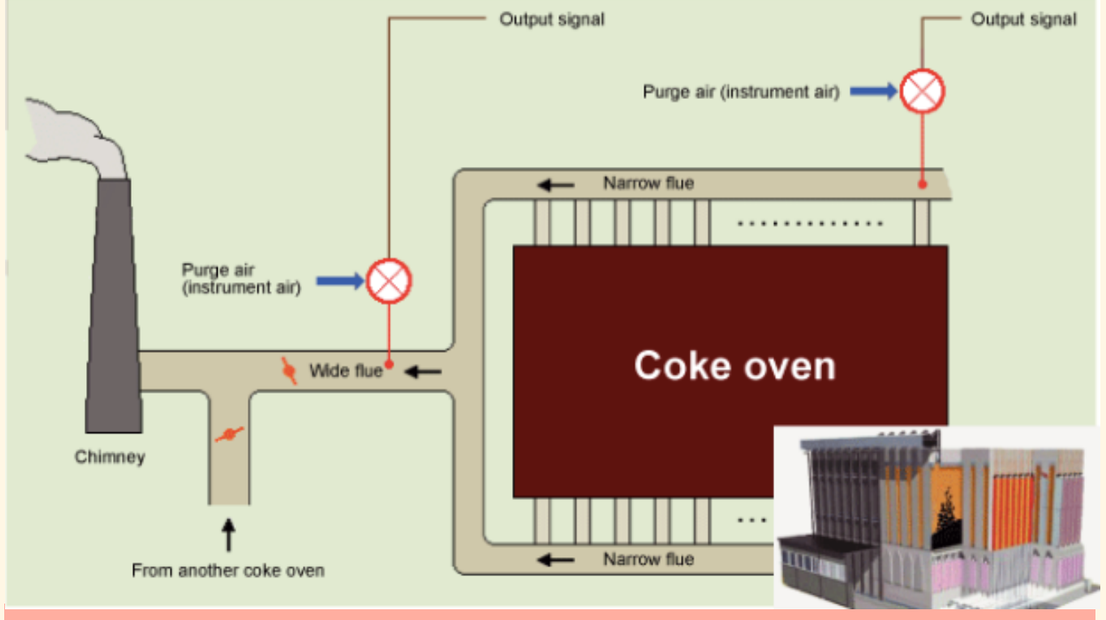
The findings from the Clairton study were part of a larger statewide study, examining asthma prevalence in 1,200 schoolchildren who either lived or attended school near industrial sites around Pittsburgh.

Dr. Deborah Gentile
Pittsburgh pediatrician and
member of the Pediatric Alliance

Why Care?

Although you may not be aware of it, air pollution in Pittsburgh affects public health, climate change, and aids in the destruction of natural habitats. “We found in Pittsburgh — because the air quality here is so terrible compared to the rest of the country — we’re in the top 2% for cancer risk from air pollution nationwide in Allegheny County,” said Goodes.

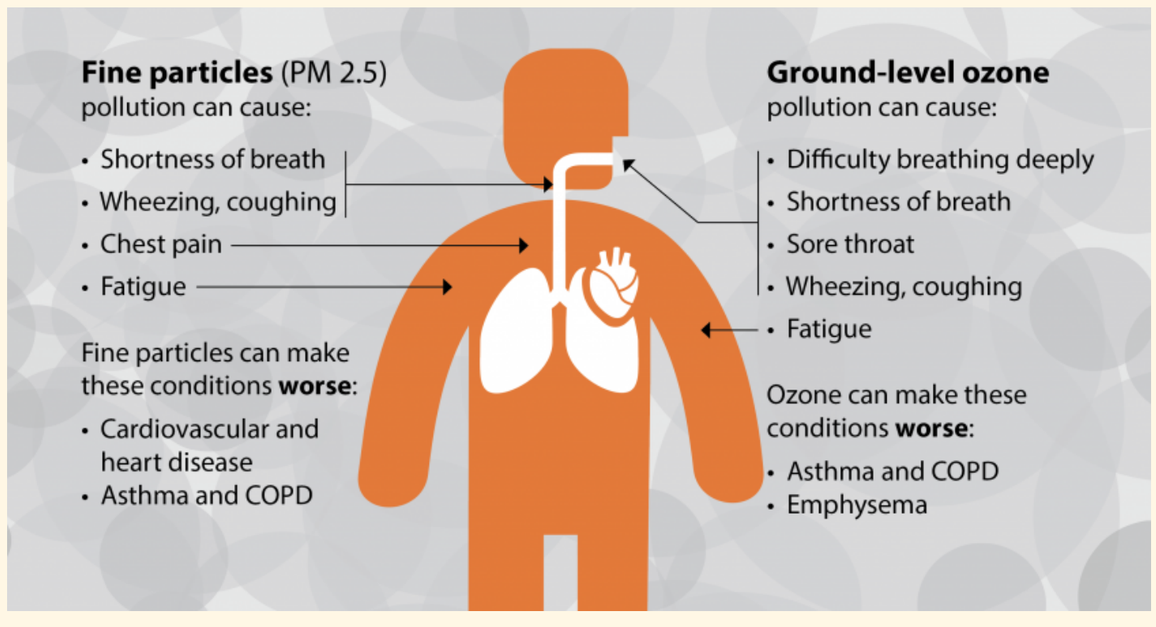
Goodes explained that we are seeing elevated rates of cancer risk and childhood asthma as a result of continuous exposure to toxic air pollutants which are known to cause cancer. Some of these hazardous air pollutants (HAPs) identified by the EPA's National Air Toxics Assessment which are known for being the “top cancer drivers” are diesel particulate matter (diesel emissions), formaldehyde, benzene, and coke oven emissions.



"Coke oven emissions come from large ovens that are used to heat coal to produce coke, which is used to manufacture iron and steel."
- National Cancer Institute

According to "The Pittsburgh Regional Environmental Threats Analysis Report," funded by the Heinz Endowments, Allegheny County ranks 63rd out of 3,225 United States counties for cancer risk by HAPs — mostly because of the unique contribution of emissions from multiple source types.

New studies are also showing that air pollution affects cardiovascular health — which could aid in triggering heart attacks — as well as neurological health, impacting diseases such as Alzheimer's and Dementia. In general, outdoor air pollution is also associated with leading to bronchitis, respiratory symptoms, and premature mortality.



In addition, humans may be at risk of experiencing a number of short-term or long-term health effects from exposure to air pollution. The short-term health effects can be categorized by eye, nose, and throat irritation, headaches, allergic reactions, and upper respiratory infections. Whereas the long-term health effects include lung cancer, brain damage, liver damage, kidney damage, heart disease, and respiratory disease.

Why Care?

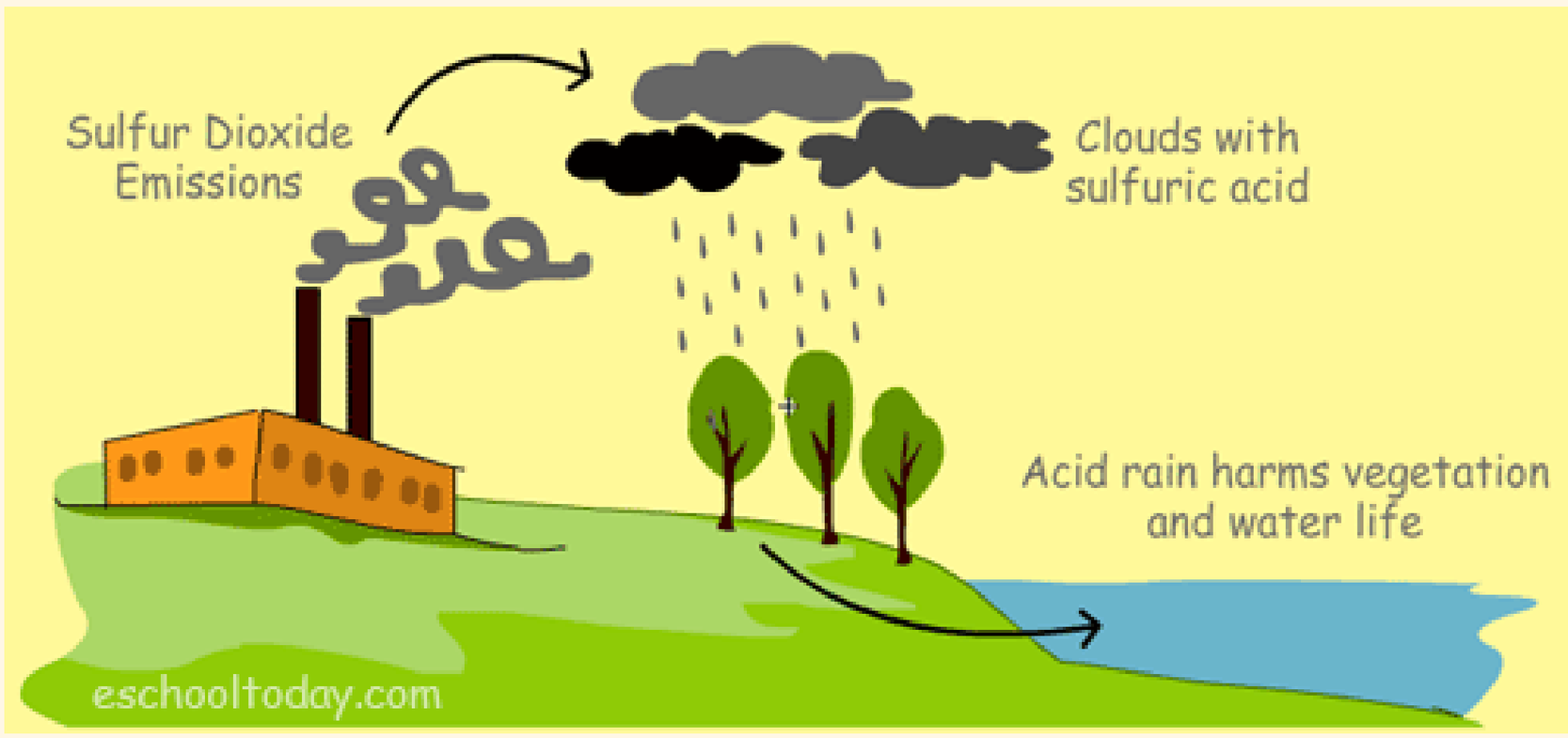
"We know that although it may not seem obvious that the air we breathe in everyday is unhealthy ... it is a slow tick affecting our health," Goodes said. "But you can tell in the rates of childhood asthma, especially around these industrial plants, that it really is affecting public health. With their release of methane and carbon dioxide from these plants, it is also increasing the effects of climate change, increasing the rates of flooding in this region especially, and forest fires in other regions, and in general more extreme weather."

The environmental damage caused by air pollution is significant: when air pollutants come into direct contact with vegetation, or settle out of the air onto land and water bodies, they can then wash into waterways from the soil or be picked up by plants and animals. This leads to damage of crops, forests, and bodies of water, and also can cause harm to animals and wildlife. According to the EPA, outdoor air is a valuable and fundamental resource, as it not only provides essential gasses to sustain life, but it shields the Earth from harmful radiation.

> "Although it may not seem obvious that the air we breathe is UNHEALTHY ... it is a SLOW TICK effecting our health."

Air pollution aids in both the depletion of the ozone layer, which protects the Earth from the sun's UV rays, and in the formation of acid rain, which causes harm to trees, soils, rivers, and wildlife. The damage air pollution causes does not stop there — the climate is also at risk with global climate change, as some pollutants have a warming effect while other have a cooling effect.

These combined negative health and environmental impacts of having a poor air quality can consequently lead to economic stresses as well. Major costs are associated with hospitalization and medical treatment for health effects, and a reduction of productivity for agricultural and forestry industries is inevitable for soil and crop damage.



What Can the People of Pittsburgh Do?

To personally help reduce air pollution, integrate these simple tasks into daily life: conserve energy — shut off the lights, run washers and dishwashers less often, reduce driving habits, take public transportation, avoid gas-powered garden equipment and burning trash, and perform regular car maintenance such as by replacing the car's air filter and oil.

PennEnvironment is targeting the Allegheny Health Department through their Clean Air for Pittsburgh Campaign to enforce the Clean Air Act in Pittsburgh on all of our industrial polluters. "A lot of what we're asking them to do is to make sure that all of the industrial polluters have their permits renewed and up to date, and the requirements for those permits change every year according to the Clean Air Act because we aren't in compliance — our air is too dirty," Goodes said.

> If we want change to happen, it has to come from the people and we have to address the system itself instead of trying to put bandaids on bleeding wounds.

According to Goodes, these large industries are supposed to enact the best existing technology to reduce air pollution each year — which many have not. The Allegheny Health Department needs to make sure these industries renew their permits and they buy the most up-to-date technologies, and if they don't, they should be fined; "If they can't afford the investment, then they should not be allowed to emit," Goodes said.

PennEnvironment encourages people to call their elected officials, vote for politicians making policy decisions to reduce air pollution, come to events that highlight protests, actions by big polluters, or to celebrate the growth of energy or electric cars.

"We know that systematic change comes from changing the system," said Goodes. "We think as a grassroots organization, if we want change to happen, it has to come from the people and we have to address the system itself instead of trying to put bandaids on bleeding wounds."

Image Sources:

Pg 1: https://www.agro-chemistry.com/news/co-emissions-as-a-feedstock-for-plastics-production/

Pg 2: http://ntsgroup.in/NTS_Industries_LLP_FRP_Grading.aspx

Pg 3: https://www.buzzfeed.com/kevintang/stunning-photos-of-pittsburghs-air-pollution-in-the-1940s

Pg 4: https://www.epa.gov/pm-pollution/particulate-matter-pm-basics

www.pennenvironment.org

https://www.linkedin.com/in/nancy-goodes/

Pg 5: https://thenounproject.com/term/pollution/15640/

Pg 6: https://stateimpact.npr.org/pennsylvania/2018/05/09/sierra-club-says-it-will-sue-cheswick-power-plant-over-air-pollution/

https://triblive.com/local/regional/14187165-74/flight-93-park-ranger-will-present-a-program-on-the-creation-of

http://lenscratch.com/2016/11/pete-marovich-searching-for-dreamstreet-com/

Pg 7: https://homesecurity.press/quotes/smoke-factories-in-black-and-white.html

http://pediatricalliance.com/providers/allergy-providers/

Pg 8: https://www.pca.state.mn.us/air/air-quality-and-health

https://homesecurity.press/quotes/controlled-atmosphere-continuous-oven.html

Pg 9: http://doctor2016.jumedicine.com/wp-content/uploads/sites/6/2018/01/Air-Pollution.pdf

Pg 10: https://homesecurity.press/quotes/cause-and-effect-grade-3-projects.html

Text Sources:
https://www.epa.gov/report-environment/outdoor-air-quality

https://www.epa.gov/clean-air-act-overview/air-pollution-current-and-future-challenges

http://www.mfe.govt.nz/more/environmental-reporting/air/air-domain-report-2014/why-good-air-quality-important

https://www.air-n-water.com/air-pollution.htm

https://www.huffingtonpost.com/entry/the-reality-of-pittsburghs-air-quality_us_59cd83cee4b09538b5074165

https://cleanair.org/public-health/pittsburgh-air-pollution/

http://www.lung.org/our-initiatives/healthy-air/outdoor/air-pollution/particle-pollution.html

https://www.allergycosmos.co.uk/air-pollution/

http://popularpittsburgh.com/darkhistory/

https://www.ehn.org/asthma-near-clairton-coke-plant-2539978896.html

http://www.heinz.org/UserFiles/Library/PRETA_HAPS.pdf