

# **Hey, hey, ho, ho, Childhood Asthma needs to go!**

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## **Abstract**

This curriculum outlines a guide for how to engage high school students in a quest for answers and solutions. The focus is on researching the environmental causes of childhood asthma in urban environments, the impact on children today, how it contributes to other health issues in children, and what solutions are available. Although statistics and other information will include the entire United States, the focus will be primarily on the city of Philadelphia. Other large urban centers will be included for perspective and for potential solutions. I don't believe you should present a problem without indicating potential solutions. This is the core of health prevention and promotion. The overall focus of the lesson plan is to create a research project designed for students to examine both causes and solutions for childhood asthma. The involvement of students occurs in the expansion of research they will undertake. Asthma impacts students in all of my classes. They are directly impacted by this condition.

## **Unit Content: Childhood Asthma**

“Come on, you can give me one more lap!!”

“I can't Miss! I can't breathe! I'm not out of shape, I just have asthma.” I can't count how many times I've heard this. I've taught for more than 20 years and as my years add up, I see the asthma diagnoses increase exponentially. I see those asterisks next to my students' names, indicating a health issue. Many of those represent asthma. Why have these numbers increased over the years? Why are there so many young people who don't have the chance to play and run like their parents did? Many of the answers lie in the environmental impact of industrialization. Currently, I teach high school students in health and physical education and children's asthma directly impacts my classes.

All hands are raised when I ask if either they or someone they know has asthma. This connection helps to assist in the motivation to participate in this series of lessons. I have intentionally left areas of the lesson somewhat broad. This lesson should be seen as a guide and can be adjusted to focus on the neighborhoods and communities of your students. I teach in a performing arts school with artists, writers, dancers, performers and media/video technicians. I set this lesson up to be presented on a slide deck or powerpoint, but it may be adjusted to be presented as a performance, article or public service announcement. Students will be guided in their project based on the narrative information below. Here are some thoughtful questions for students which will be answered in this narrative section:

What is asthma? How can we identify childhood asthma? What causes childhood asthma? Are there issues in their immediate environment (home, neighborhood) that are contributing to asthma? What about their city? What about their state/country/world? What about climate change? What are the numbers? How many children in urban environments have been diagnosed with asthma over the last 30 years? Has it increased or decreased? Once we discover

the factors, we'll research how asthma can affect other diagnoses, like obesity, susceptibility to other viruses, and any other illnesses. After connecting asthma to their overall wellness (which is a big focus in my class), we'll work toward solutions. What can we do in our micro-environments and in the macro-environment to reduce the causes? What can we do to lessen the severity? How can their parents' choices and their personal choices lessen their exposure to asthma? (i.e. decisions such as smoking, and vaping)

New technologies and medications are constantly being developed to combat various ailments and illnesses, but what about the role of prevention? Where does the responsibility of government and private industry begin and end? Is childhood asthma preventable, or just treatable? How does childhood asthma exacerbate the health and well-being of young people as they develop into adults? Are environmental or genetic factors a greater cause of childhood asthma? If it is genetic, is there a way to correct or lessen the severity of episodes in children? If it is environmental, what is the most significant cause? What can be done to lessen or eliminate the most significant causes and other lesser causes? Does living in urban centers such as Philadelphia contribute to increased cases of childhood asthma? Are there other urban centers that have successfully decreased this impact? We will explore the causes and effects of childhood asthma from an environmental focus. Is the home environment a significant factor? How does the neighborhood and school impact childhood asthma? Do caregivers know when to access their health providers? How can they keep their children as healthy as possible?

According to the Centers for Disease Control (CDC, 2019), "About 6 million children in the US ages 0-17 years have asthma. More than half of all children with asthma had 1 or more asthma attacks in 2016. Every year, 1 in 6 children with asthma visits the ED, and about 1 in 20 children with asthma are hospitalized for asthma."

Before we work toward causes, impacts, and solutions, we must reach an understanding of what childhood asthma is.

What is asthma? According to the American College of Allergy, Asthma and Immunology, (ACAAI, 2023), there are two types of asthma: Allergic: This type is triggered by exposure to an allergen such as mold or pet dander. Non-allergic: This is brought on by factors such as stress, exercise, illness, extreme weather, irritants in the air, and certain medications.

According to the Mayo Clinic, in childhood asthma, the lungs and airways become easily inflamed when exposed to certain triggers. Such triggers include inhaling pollen or catching a cold or other respiratory infection. Childhood asthma can cause irritating daily symptoms that interfere with play, sports, school, and sleep. In some children, unmanaged asthma can cause dangerous asthma attacks. Childhood asthma isn't a different disease from asthma in adults, but children face unique challenges. The condition is a leading cause of emergency department visits, hospitalizations, and missed school days. Unfortunately, childhood asthma cannot be cured, and symptoms can continue into adulthood. But with the right treatment, patients can keep symptoms under control and prevent damage to growing lungs. (Mayo Clinic (2020) Medline Plus focuses on symptoms. "Asthma is a chronic (long-term) lung disease. It affects your airways, the tubes that carry air in and out of your lungs. When you have asthma, your airways can become inflamed and narrowed. This can cause wheezing, coughing, and tightness in your

chest. When these symptoms get worse than usual, it is called an asthma attack or flare-up.” (Medlineplus, 2023)

Each of these descriptions serve to inform us of the complications that can arise from asthma and clarify that children are particularly vulnerable. What makes children more vulnerable than adults?

Children are more susceptible for the following reasons (Caroquino, 2012):

1. Babies are rapidly growing and developing; triple their weight from birth to one year.
2. Eat more per body weight than adults (kids 1-5 years eat 3-5 times more than adults)
3. Drink more water per body than adults (88 vs 17 ml/kg/day)
4. Have increased respiratory rate and breathe in more toxins per body weight than adults; playing vigorously for long time periods (MV 400 vs. 150 ml/kg)

Common childhood asthma symptoms include the following:

- A whistling or wheezing sound when breathing out.
- Shortness of breath.
- Chest congestion or tightness.
- Frequent coughing that worsens when a child:
  - Has a viral infection.
  - Is sleeping.
  - Is exercising.
  - Is in the cold air.

Childhood asthma also might cause:

- Trouble sleeping due to shortness of breath, coughing or wheezing.
- Bouts of coughing or wheezing that get worse with a cold or the flu.
- Delayed recovery or bronchitis after a respiratory infection.
- Trouble breathing that hampers play or exercise.
- Fatigue, which can be due to poor sleep.

Asthma symptoms vary from child to child and might worsen or improve over time. A child might have only one symptom, such as a lingering cough or chest congestion. It can be difficult to tell whether symptoms are caused by asthma. Wheezing and other asthma-like symptoms can be caused by infectious bronchitis or another respiratory problem.

As we can note from this information, childhood asthma can affect the overall well-being of children and can impact the family. When there is an increase in levels of illness, frequency of hospital trips, lack of physical activity, and sleep, typical activities of both the child and caretakers will be affected. As we describe the environmental causes and solutions of childhood asthma, we must keep in mind the larger impact of this illness. When children are sick, they must be cared for which can have a significant economic impact on families. It can be especially devastating for a low-income, hourly employee without sick time. We also must consider medical and transportation costs. Is there access to high quality health care? Also, of note is the

fact that many low-income families qualify for health plans such as Medicaid but for those who are just above the qualifying threshold, costs can be prohibitive. Doctors' appointments can have high co-pays and prescriptions may not be fully covered. Trips to the emergency room or a stay in the hospital may not be something many families can afford. They may choose not to seek treatment until they are in a dire situation. There is also the concern of immigration status and fear of deportation or medical costs if they bring their children to the hospital without insurance. Because there may be hesitations to receive medical care in a timely manner, many families can have heartbreaking situations which could have been avoided with preventive care. When we consider the overall health of the child, if they cannot exercise and are fatigued from asthma flare-ups, their learning can be affected significantly. It also increases the likelihood of other problems such as obesity and diabetes which bring new health challenges.

Let's look at how many children are affected and what are the potential causes of childhood asthma. How many children are affected by asthma in Philadelphia as well as the United States as a whole? And how do race/ethnicity and socioeconomic status affect those numbers? The following information was provided by the [Philadelphia Regional Center for Children's Environmental Health](#):

According to the [Centers for Disease Control and Prevention](#), 5.8% of children in the U.S. have asthma. This rate is more than triple for Philadelphia children, with an asthma prevalence rate of 21%. In 2020, non-Hispanic Black and Hispanic children had over **4 times** more asthma-related hospitalizations in Philadelphia compared to non-Hispanic White children. Asthma disparities may be explained by a combination of genetics and social determinants of health which include where children live, grow, learn, and play. [Indoor and outdoor air pollution](#) both contribute to the high prevalence of asthma in the Philadelphia region.

Historically asthma rates were even higher. The CDC published Asthma Surveillance– United States, 2006–2018. (CDC, 2021) Here is a summary of their findings regarding asthma in the U.S. population:

During 2016–2018, approximately 8.0% of the U.S. population reported having current asthma, with 8.1% among children aged 0–17 years and 7.9% among adults aged  $\geq 18$  years.

Current asthma prevalence was lowest among children aged 0–4 years (4.0%) and highest among those aged 12–17 years (10.5%). Among all ages, the prevalence was higher among Black persons (10.7%) and persons of multiple races (13.1%) and lower among Asian (4.5%) and Hispanic persons (6.5%) than among White persons (8.0%) (Figure 1) (Supplementary Table 1, <https://stacks.cdc.gov/view/cdc/109086>). Among Hispanic persons, Puerto Rican persons had a higher prevalence of asthma (14.0%) than Mexican (5.4%) and other Hispanic persons (6.3%) (Figure 1) (Supplementary Table 1, <https://stacks.cdc.gov/view/cdc/109086>).

The highest prevalence rates of asthma are among black and Puerto Rican persons which is a significant population of Philadelphia. How do these numbers differ from the local community of Philadelphia?

According to the Philadelphia Department of Public Health's Health of the City Report(2021), "Non-Hispanic Black and Hispanic children had asthma-related hospitalization rates of over 4 times higher than non-Hispanic whites. These are children mostly living in the upper North, lower Northeast, and West Philadelphia areas. Approximately 5% of all emergency visits in 2020 were asthma-related. Hospitalization rates were 17% city-wide, with 27.8% black and 15.8% Hispanic. Whites and Asians made up 4.2% and 1.3% respectively."

The report also noted "Blacks make up 40.2 percent of the population of Philadelphia, Whites make up 34.2 percent and Hispanics are 15.7 percent. Asians make up 7.7 percent and 2.2 percent identify as other."

Taking these numbers into consideration, we can see what a significant impact this illness can have on a community such as Philadelphia with this population having a higher prevalence of childhood asthma. Now, that we have defined childhood asthma and know the numbers, let's turn our attention to the causes and potential solutions. As we will see, the environment plays a significant role in childhood asthma.

What causes childhood asthma? Childhood asthma causes aren't fully understood. According to (Carroquino, 2012), "Some factors thought to be involved include the following:

- A tendency to develop allergies that runs in the family.
- Parents with asthma.
- Some types of airway infections at a very young age.
- Exposure to environmental factors, such as cigarette smoke or other air pollution.

Increased immune system sensitivity causes the lungs and airways to swell and produce mucus when exposed to certain triggers. Reaction to a trigger can be delayed, making it more difficult to identify the trigger. Triggers vary from child to child and can include:

- Viral infections such as the common cold.
- Exposure to air pollutants, such as tobacco smoke.
- Allergies to dust mites, pet dander, pollen or mold.
- Physical activity.
- Weather changes or cold air.

Sometimes, asthma symptoms occur with no apparent triggers."

Are there also certain risk factors that make children more susceptible to asthma? Looking at the following list provided by [Asthma | Philadelphia Regional Center for Children's Environmental Health](#) (2023), we can see that many of these factors intertwine with living in Philadelphia:

Factors that might increase your child's chance of developing asthma include:

- Exposure to tobacco smoke, including before birth.
- Previous allergic reactions, including skin reactions, food allergies or hay fever, also called allergic rhinitis.
- A family history of asthma or allergies.
- Living in an area with high pollution.\

- Obesity.
- Respiratory conditions, such as a chronic runny or stuffy nose, inflamed sinuses, or pneumonia.
- Gastroesophageal reflux disease (GERD).
- Being male.
- Being Black or Puerto Rican.

The first step to prevent childhood asthma is to keep the child as healthy as possible. This includes playing outdoors and getting regular exercise. Drinking plenty of water and having a healthy diet are a high priority as well. Keeping a child active can increase lung capacity and the level of lung function. It can also minimize obesity, which can exacerbate other health issues such as diabetes. Not all children have a safe space to be outdoors in their neighborhoods, so it is extremely important that schools make sure children get plenty of time to play and move their bodies. Clean classrooms and functioning air filters are also necessary to minimize triggers of asthma, especially in smaller children. It's also important for the schools to be able to provide healthy meals, especially when parents cannot. The more we can do to improve the health of children, the less likely they are to become susceptible to various diseases. These basic steps of a healthy lifestyle are not always enough to prevent childhood asthma. Because of the higher levels of susceptibility in children, environmental factors can have a greater impact on the likelihood of asthma developing. The list above notes potential triggers for asthma attacks, but they also can be labeled as environmental causes of asthma.

Indoors triggers of asthma:

- Dust mites: They mostly live in bedding and can make asthma worse. Your child may be exposed to dust mites from carpets, mattresses, pillows, stuffed toys, bedcovers, and upholstered furniture.
  - Smoke
  - Animals with fur or feathers
  - Pests like cockroaches and rodents
  - Physical activity
  - Pollen
  - Weather changes
  - Colds and viruses
  - Strong smells and fragrances, particularly in sprays
  - Mold
  - Laughing hard, crying, or yelling

Pollution, weather changes, colds, and viruses could be considered part of the larger environment, but they can impact the indoor quality of life. As the weather cools, space heaters, lack of fresh air, and minimal physical activity can impact those with asthma. During the warmer months, portable/ window air conditioners and an increase in roaches, rodents, and mold as well as pollen can trigger flare-ups. Dust mites, pets, strong smells, and smoke tend to occur

throughout the year. Looking at these triggers, we can also note that many of them are preventable and, with the right education and support, can be minimized, if not eliminated, from the home environment.

What are techniques that can help to minimize triggers in the indoor environment? What is under the sink in the home? Certain cleaning products, aerosols, and air fresheners can irritate the lungs. If they cannot be completely eliminated, then make sure they are used in an open space or with the windows open and exhaust fan on at a minimum. Keep asthma prone individuals away from these products when they are in use. Switch cleaning products for more natural solutions like baking soda, vinegar and dish soap. If pollen is a trigger, air conditioning units that filter the air may need to be used more often during high pollen seasons. When sweeping, dust just flies back up in the air increasing exposure, so using a wet mop and damp dust cloth can be more helpful in minimizing flare ups. Wash bedding regularly or use dust mite covers. Pet dander or roach and mice droppings may also trigger asthma. Care should be taken to eliminate these triggers when possible. Take shoes off when entering the house. Although this is not an American custom, it is a custom in many parts of the world. It makes perfect sense. Why would you want to track all the grime and dirt from the world into your own home? If members of the household work in businesses with a lot of dust, remove the outer layer of clothes before coming in the home if possible. More significant than all of these items is something that is completely preventable: Cigarette smoke. Second hand smoke can cause significant damage to developing lungs and ear canals in babies and children.

According to the Philadelphia Regional Center for Children's Environmental Health (PRCCEH, 2023) "The chemicals from cigarettes can settle on surfaces and trigger an asthma attack. Secondhand and even thirdhand smoke can trigger an asthma attack." Secondhand smoke can cause serious health problems in children. The following information is provided by the Asthma and Allergy Foundation of America Studies show that older children whose parents smoke get sick more often. Their lungs grow less than children who do not breathe secondhand smoke. They also get more bronchitis and pneumonia (AAFA, 2023).

Wheezing and coughing are more common in children who breathe secondhand smoke. Secondhand smoke can trigger an asthma attack in a child. Children with asthma who are around secondhand smoke have worse and frequent asthma attacks. More than 40 percent of children who go to the emergency room for asthma live with smokers. Children whose parents smoke around them get more ear infections. They have fluid in their ears more often. They also have more operations to put in ear tubes for drainage.

Finally, there are options for assistance with helping to create a healthier home environment. The Philadelphia Energy Authority has a program called "Built to Last". According to their website, "PEA created the Built to Last program, a "one stop shop" whole home repair program, to serve Philadelphia homeowners. Built to Last brings together Philadelphia's home repair, energy conservation, and healthy homes programs into a coordinated service package to make homes more affordable, healthier, and safer places to live. Built to Last delivers critical home repairs, health and safety improvements, and energy efficiency and clean energy improvements. Built to Last is funded in part by the PA Whole Homes Repair Program." (PEA,2023)

As children with asthma leave their homes, what is going on in the city of Philadelphia that can increase the likelihood of a flare-up? We can look at the overall impact of air quality and consider two important contributors to asthma: particulate matter and ground level ozone. The density of traffic in Philadelphia directly correlates to the air quality of the community at large. Not only is the standstill traffic an issue, but the idling of cars near schools and homes creates a significant impact on school age children. The children breathe these exhaust fumes which, in turn, exacerbates the asthma.

Scientific studies have shown the increased risks of asthma with pollution. Proximity to heavily trafficked roads have been associated with asthma and reduced lung function as well as other respiratory symptoms such as wheeze and dry cough. Lin found significant odds ratios for living within 200 m of a street with the highest tertile of traffic density and asthma prevalence, and the children with asthma were more likely to have truck traffic on their street (Lin et al., 2002). Although earlier studies sometimes showed no increased risk (English, 1999), the weight of evidence suggests that traffic pollution is associated with the risk of developing asthma (Schwartz, 2004)

Particulate matter from many sources and ground-level ozone together can have a significant impact on children with asthma. Children with asthma have increased airway reactivity making the effects of air pollution on the respiratory system more serious for them. Following exposure to high levels of particulate pollution, children with asthma have been shown to experience more respiratory symptoms, use more medication, produce chronic phlegm, and have more bronchitis (Ostro et al., 2001, McConnell et al. 2003). Air pollution is also associated with increased school absenteeism due to respiratory illness (Gilliland, 2001), and increased admissions to hospital emergency departments (Tolbert, 2000).

One of the positive aspects of Philadelphia is its commuter rail system. Cities such as Philadelphia and New York have been able to reduce a significant number of cars on the road compared to Los Angeles which has very limited mass transit options. Unfortunately, anyone who is on N. Broad street in Philadelphia at 5:30 PM recognizes that there is still far too much traffic. Busses could be more environmentally friendly and greater tax breaks for using public transportation would also improve the air quality. Also, the closing of the refinery has greatly reduced the volatile organic chemicals in the air which had caused so much damage over the past decades. Large trucks also cause widespread emissions in the city. Moving toward electric vehicles and low emission vehicles will decrease the particulate matter exposure in the city as well. The simplest solution for the car idling issue is for drivers to turn off their engines while they wait to pick up their children. Taking into consideration the small stature of young children, their faces are closer to the car exhaust and they breathe in significantly more pollution than adults. Philadelphia is a no-idling zone, but there is limited enforcement. I believe education about idling cars would reduce the numbers. Give caretakers the information about what damage idling cars can do to their little ones and there will be change. If parents were given fliers at drop off, in the moment, they would be able to connect the problem and solution.

Why aren't preventive measures occurring? I don't believe people intentionally want to damage children's lungs. I believe there is a lack of understanding and knowledge when it comes to asthma prevention. If we can prevent asthma in the first place, that is the greatest win. But if



children already have asthma, we need to look at what we can do to decrease the likelihood of an asthma attack. In the previous pages, both causes and solutions for childhood asthma have been addressed, but what should parents and caretakers know about the diagnosis and how to minimize flare-ups?

According to the Philadelphia Regional Center for Children's Environmental Health, ([Asthma | Philadelphia Regional Center for Children's Environmental Health](#)). (2023) parents should look for the following signs to know when to see the doctor:

Appointments should be made when:

- Coughing that is constant, intermittent, or seems linked to physical activity.
- Wheezing or whistling sounds when a child breathes out.
- Shortness of breath or rapid breathing.
- Complaints of chest tightness.
- Repeated episodes of suspected bronchitis or pneumonia.

Children who have asthma may say things such as, "My chest feels funny" or "I'm always coughing." Parents should listen for coughing in children, which might not wake them when they are asleep. Crying, laughing, yelling, or strong emotional reactions and stress also might trigger coughing or wheezing.

The Center also indicates when emergency treatment should be sought ( [Asthma | Philadelphia Regional Center for Children's Environmental Health](#). (2023)):

In severe cases, a child's chest and sides may pull inward when breathing is difficult. He or she might have an increased heartbeat, sweating, and chest pain. Caregivers should seek emergency treatment when a child:

- Has to stop in midsentence to take a breath.
- Is using abdominal muscles to breathe.
- Has widened nostrils when breathing in.
- Is trying so hard to breathe that the abdomen is sucked under the ribs during a breath.

Even if your child hasn't been diagnosed with asthma, seek medical attention immediately if you notice troubled breathing. Although asthma episodes vary in severity, asthma attacks can start with coughing, which progresses to wheezing and labored breathing.”

Regular appointments with primary physicians should be maintained. There are also additional options provided by the government that can support children with asthma. The Centers for Disease Control (CDC) has a program called CCARE which was created to develop strategies to assist in the prevention and reduction of childhood asthma. ( CDC, 2023) Under this umbrella it has developed a program called NACP. (National Asthma Control Program) “CDC’s [National Asthma Control Program \(NACP\)](#) and its partners help people with asthma achieve better health and improved quality of life. NACP developed EXHALE, a set of six strategies that each contribute to better asthma control.”

The following explains the EXHALE strategies (CDC, 2023):

The six strategies in EXHALE can have the greatest impact when used together in every community.

## EDUICATION

on asthma self-management

## X-tinguishing

smoking and exposure to secondhand smoke

## Home

visits for trigger reduction and asthma self-management education

## Achievement

of guidelines-based medical management

## Linkages

and coordination of care across settings

## Environmental

policies or best practices to reduce asthma triggers from indoor, outdoor, or occupational sources

Education on asthma self-management (AS-ME) is part of EXHALE, a set of six strategies used by CDC's National Asthma Control Program and its partners to help Americans with asthma.

Education on asthma self-management can:

- Improve medication adherence among people with asthma;
- Reduce asthma-related emergency department (ED) visits and hospitalizations;
- Decrease missed school or work days because of asthma; and
- Reduce healthcare costs.

AS-ME includes educating people with asthma and their families to:

- Use asthma medications correctly;
- Reduce exposures to asthma triggers such as cockroaches or mold; and
- Manage their condition when asthma symptoms worsen.

AS-ME can be delivered in various settings, including clinics, EDs, hospitals, pharmacies, schools, and homes.

Education is key to minimizing and preventing the effects of childhood asthma. As we learn more about the damage that can be caused by preventable measures, such as indoor cleaning supplies, air fresheners, car idling and smoking, we can improve the quality of life for asthmatic children. We will also lessen the likelihood of more children becoming asthmatic with preventative measures. This all has a domino effect. If children are healthy and active, they are less likely to develop other preventable diseases such as diabetes and heart disease. Fewer sick children also means fewer trips to the hospitals, less time off of work for caretakers and an

increase in overall well-being for the entire family. As our students learn and engage in this topic, they can spread their knowledge. The results can be exponential.

### **Teaching Strategies**

#### **Differentiated instruction learning stations:**

Teachers set up students in various groups in a round robin style. Students can either be grouped by major or by combining different strengths of students. They can either be required to research each area as a group or move from table to table and contribute research findings to the group as a whole.

#### **Inquiry-based instruction:**

Students are given some sample questions and encouraged to create their own questions based on the information provided to them. They follow up with their own inquiries and attempt to research answers based on their own questioning.

#### **Utilizing technology in the classroom:**

This is a research-based project and students will be required to use the internet at a minimum. They can also use technology to create movies, PowerPoints, or public service announcements when presenting their information.

#### **Cooperative learning:**

Students will be working in groups for this project. They will be collaborating with either other students from their major or students from various majors. For example, a writing major will be teamed up with a theater major and an art major so each can use their strengths to contribute to the project. Students will be required to divide tasks and collaborate in creating a finished product for presentation.

#### **Graphic organizers:**

Students will use graphic organizers as a tool to organize their data and information. They may choose whether they create drawings or written work, or use technology. Students will organize their information in the most productive way for their individual group.

### **Classroom Activities**

#### **THE PENNSYLVANIA STATE STANDARDS:**

The following are the Pennsylvania state standards that the lesson plan connected with my research project will cover:

10.1.12 A. Evaluate factors that impact growth and development during adulthood and late adulthood. (acute and chronic illness, communicable and non-communicable diseases, health status, relationships, career choice, aging process, retirement)

10.1.12 B. Evaluate the factors that impact the body systems and apply protective/ preventative strategies (fitness level, environment (pollutants, available health care), health status, nutrition)

10.1.12 E. Identify and analyze factors that influence the prevention and control of health problems. (research, medical advances, technology, government policies/regulations)

10.2.12 E. Analyze the interrelationship between environmental factors and community health (public health policies and laws/ health promotion and disease prevention, individual choices/ maintenance of environment, recreational opportunities/ health status)

10.1.9 B. Analyze the interdependence existing among the body systems

10.1.9 E. Analyze how personal choice, disease, and genetics can impact health maintenance and disease prevention

10.2.9 E Explain the interrelationship between the environment and personal health

### **The Overview of the Lesson Plan 9-12**

**This is a summary of the entire outline. Following the summary will be the expanded lessons for each day.**

This set of lessons will take approximately 8- one-hour classes. Each lesson number represents one full day of lessons. The entire set will cover the standards above. Students will work collaboratively in pairs or groups of three to create their asthma awareness and reduction program.

### **Lesson Outline:**

**By the end of each lesson series, students will be able to reach the following outcomes:**

1. Initial ideas will be brainstormed based on what they already know. Students will begin to research childhood asthma and by the end of the period, they will be able to define childhood asthma. They will also be able to identify the percentage of children affected in the United States versus the percentage of children in Philadelphia and report their findings.
2. Students will be able to research the causes of asthma, both genetic and environmental. They will identify what causes cannot be controlled by individual choice versus what health decisions an individual or family can make.
3. They will start to formulate their ideas on which environmental causes are within the homes of Philadelphia residents. They will find a minimum of 5 sources. What can exacerbate asthma in the home and what can be removed or replaced to mitigate asthma flare-ups?
4. Students will be able to identify at least five environmental causes of childhood asthma in the Philadelphia community at large. Other than physical causes, are there socio-

economic causes or issues with access to health care? They will also compare these causes, to those of the country in general.

5. Students will be able to identify a minimum of five solutions to the environmental causes in the community. They will discover ways to implement these solutions, including ease or difficulty of implementation. They will research what steps need to be taken for these solutions including but not limited to the following: Who makes the decisions? How can they be contacted? What alternatives can be implemented? What is the timeframe and/or likelihood for the implementation?
6. Students will organize their findings into a slide deck presentation and will prepare their research results.
7. Students will present their findings to the class. They will take notes on their classmates' presentations.
8. Students will discuss the projects with fellow classmates to review what challenges they faced, what went well, and what they can do to implement the solutions they discovered.
- 9.

**Learning Objectives: By the end of the series of lessons, the following will occur:**

Students will be able to understand terminology related to childhood asthma.

Students will discover environmental and genetic causes for childhood asthma, both in the United States and in Philadelphia.

Students will be able to create surveys for research purposes.

Students will be able to graph responses to surveys and connect results with research.

Students will be able to provide multiple solutions for environmental causes of asthma, both in homes and in the larger community.

Students will be able to present their findings in an organized, effective manner.

**Assessment:**

Students will record and report their findings each day at the end of the class period as part of their exit ticket. As they work towards their presentation completion, students will share rough drafts with the teacher for feedback.

The culmination of the project will result in a slide deck presentation that has included the following sections to receive full credit:

1. Definition of childhood asthma
2. Percentage of cases in Philadelphia versus the United States at large
3. Environmental and genetic causes
4. Is childhood asthma caused by individual and/or family choices?
5. 5 environmental causes of childhood asthma related to homes

6. 5 solutions for the causes within homes
7. 5 environmental causes of childhood asthma related to the Philadelphia community at large
8. 5 solutions for the environmental causes in the community
9. Ability/ likelihood for causes to be implemented
10. Other factors not considered above such as socioeconomic status or healthcare access

Students will be graded on the 10 areas above. They will also be graded on the neatness of the slide deck, the organization of the presentation, and the ability to speak to the audience in a clear, concise manner. Creativity will add bonus points. The appendix will show my rubric and grading system but it may be adjusted for your grading process.

**Vocabulary terminology:**

Students will be able to define the following vocabulary terms: asthma, pollution, lungs, particles, toxins, environment, health promotion, disease, urban, aerosols, chronic illness, and non-communicable diseases.

**Differentiation:** Students may opt for only oral presentation or visual presentation in accordance with their IEPs.

**FULL BREAKDOWN OF LESSONS FOR EACH DAY:**

**Day 1 of 8:**

**Preparation:** Whiteboard/chalkboard/ smartboard and Chromebooks. Without Chromebooks, students will need paper and writing instruments.

Students will be placed in pairs or groups of 3, depending on class size.

**State standards:**

10.1.12 A. Evaluate factors that impact growth and development during adulthood and late adulthood. (acute and chronic illness, communicable and non-communicable diseases, health status, relationships, career choice, aging process, retirement)

10.1.12 B. Evaluate the factors that impact the body systems and apply protective/ preventative strategies (fitness level, environmental pollutants, available health care, health status, nutrition)

10.1.9 E. Analyze how personal choice, disease, and genetics can impact health maintenance and disease prevention

**Type of instruction:** Cooperative learning, utilizing technology in the classroom, and inquiry-based instruction

**Activity:** Students will brainstorm the following topic in their small groups, based on their previous knowledge.

15 minutes: Set up small groups and provide students with the following ideas to brainstorm: What is asthma? What causes it? Are there ways to prevent it or cure it? Are there issues in their immediate environment (home, neighborhood) that are contributing to asthma? What about their city? What about their state/country/world? What about climate change? What are the numbers? How many children in urban environments have been diagnosed with asthma over the last 30 years? Has it increased or decreased? Once we discover the factors, we'll research how asthma can affect other diagnoses, like obesity, susceptibility to other viruses, and any other illnesses. After connecting asthma to their overall wellness (which is a big focus in my class), we'll work toward solutions. What can we do in our micro-environments and in the macro-environment to reduce the causes? What can we do to lessen the severity? How can their personal choices lessen their exposure to asthma? (i.e. decisions such as smoking, and vaping)

New technologies and medications are constantly being developed to combat various ailments and illnesses, but what about the role of prevention? Where does the responsibility of government and private industry begin and end? Is childhood asthma preventable, or just treatable? How does childhood asthma exacerbate the health and well-being of young people as they develop into adults? Are environmental or genetic factors a greater cause of childhood asthma? If it is genetic, is there a way to correct or lessen the severity of episodes in children? If it is environmental, what is the most significant cause? What can be done to lessen or eliminate the most significant cause and other lesser causes? Does living in urban centers such as Philadelphia contribute to increased cases of childhood asthma? Are there other urban centers that have successfully decreased this impact? We will explore the causes and effects of childhood asthma from an environmental focus. How does the neighborhood and school impact childhood asthma? Is the home environment a significant factor? Is there accessibility to quality health care?

15-20 minutes: explanation of their projects. Question and answer session regarding the final project:

The following results are expected for full credit and the project is going to be built over 8 sessions.

1. Definition of childhood asthma
2. Percentage of cases in Philadelphia versus the United States at large
3. Environmental and genetic causes
4. Is childhood asthma caused by individual and/or family choices?
5. 5 environmental causes of childhood asthma related to homes
6. 5 solutions for the causes within homes
7. 5 environmental causes of childhood asthma related to the Philadelphia community at large
8. 5 solutions for the environmental causes in the community
9. Ability/ likelihood for causes to be implemented
10. Other factors not considered above such as socioeconomic status or healthcare access

Provide a rubric for students at this time. (see appendix)

For the last 10 minutes of class: Have students find websites that can give them information on the topic, bookmark sites, and have them share the sites with their teammates. Links to share with students are in Appendix A.

## **Day 2 of 8:**

**Preparation:** Whiteboard/chalkboard/ smartboard and Chromebooks. Without Chromebooks, students will need paper and writing instruments.

### **State Standards:**

10.1.12 A. Evaluate factors that impact growth and development during adulthood and late adulthood. (acute and chronic illness, communicable and non-communicable diseases, health status, relationships, career choice, aging process, retirement)

10.1.12 B. Evaluate the factors that impact the body systems and apply protective/ preventative strategies (fitness level, environment (pollutants, available health care), health status, nutrition)

10.1.12 E. Identify and analyze factors that influence the prevention and control of health problems. (research, medical advances, technology, government policies/regulations)

**Type of instruction:** Cooperative learning, inquiry-based instruction, utilizing technology in the classroom, and graphic organizers

### **Activity:**

5-minute introduction: Students take the ideas they brainstormed and separate them into the following categories:

1. Definitions of terms: asthma, pollution, lungs, particles, toxins, environment, health promotion, disease, urban, aerosols, chronic illness, and non-communicable diseases
2. Prevalence of childhood asthma (Philadelphia vs. USA) (find at least 5 facts for Philadelphia and 5 facts for the United States)

Students will create flip charts (either on paper or computer) with these topic headings. 35-40 minutes: Students work on the above areas listed in the introduction and record their findings. The teacher moves from group to group to see what students are finding and make sure they are collaborating appropriately in groups.

10 minutes: Wrap up: make sure students have clearly recorded their findings and have also noted where they have found their information. At this point, check in with students to see which groups are having trouble with their research and which students are succeeding. Let students support each other with ideas for where to find answers.

## **Day 3 of 8:**



**Preparation:** Whiteboard/chalkboard/ smartboard and Chromebooks. Without Chromebooks, students will need paper and writing instruments.

**State Standards:**

10.1.12 A. Evaluate factors that impact growth and development during adulthood and late adulthood. (acute and chronic illness, communicable and non-communicable diseases, health status, relationships, career choice, aging process, retirement)

10.1.12 B. Evaluate the factors that impact the body systems and apply protective/ preventative strategies (fitness level, environment (pollutants, available health care), health status, nutrition)

10.1.12 E. Identify and analyze factors that influence the prevention and control of health problems. (research, medical advances, technology, government policies/regulations)

10.1.9 E. Analyze how personal choice, disease, and genetics can impact health maintenance and disease prevention

Type of instruction: Utilizing technology in the classroom, cooperative learning, inquiry-based instruction, and graphic organizers

**Activity:**

5-10 minute introduction: Today students start to formulate their ideas on which environmental causes are within the homes of Philadelphia residents. They will find a minimum of 5 sources. What can exacerbate asthma in the home and what can be removed or replaced to mitigate asthma flare-ups?

1. Causes of childhood asthma (environmental vs genetic)
2. Environmental causes: indoor (home environment)
3. Environmental causes: outdoor (home environment)
4. What are solutions to help prevent asthma in the home environment

Students will continue working on flip charts (either on paper or computer) with these topic headings. Under each heading, they will research and identify at least 5 responses for each area

35-40 minutes: Students work on the above areas and record their findings. The teacher moves from group to group to see what students are finding and make sure they are collaborating appropriately in groups.

10 minutes: Wrap up: make sure students have clearly recorded their findings and have also noted where they have found their information. At this point, check in with students to see which groups would like to share some of their findings. Let students support each other with ideas for where to find answers.

**Day 4 of 8:**

**Preparation:** Chromebooks. Without Chromebooks, students will need paper and writing instruments but someone in the group must have internet access.

**State Standards:**

10.1.12 A. Evaluate factors that impact growth and development during adulthood and late adulthood. (acute and chronic illness, communicable and non-communicable diseases, health status, relationships, career choice, aging process, retirement)

10.1.12 B. Evaluate the factors that impact the body systems and apply protective/ preventative strategies (fitness level, environment (pollutants, available health care), health status, nutrition)

10.1.12 E. Identify and analyze factors that influence the prevention and control of health problems. (research, medical advances, technology, government policies/regulations)

Type of instruction: Cooperative learning, inquiry-based instruction, and graphic organizers

**Activity:**

5-10 minutes introduction: Today students will work to identify at least five environmental causes of childhood asthma in the Philadelphia community at large. Other than physical causes, are there socio-economic causes or issues with access to health care? They will also compare these causes, to those of the United States

1. Environmental causes of childhood asthma in Philadelphia
2. Ways to mitigate the causes of childhood asthma in the city
3. Environmental causes of childhood asthma in the United States
4. Nationwide solutions for childhood asthma in the United States.

Students will continue working on flip charts (either on paper or computer) with these topic headings. Under each heading, they will research and identify at least 5 responses for each area

35-40 minutes: Students work on the above areas and record their findings. The teacher moves from group to group to see what students are finding and make sure they are collaborating appropriately in groups.

10 minutes: Wrap up: make sure students have clearly recorded their findings and have also noted where they have found their information. Have students look back at the information they have collected over the past 3 classes and scan for connections between findings. Let students support each other with ideas for where to find answers.

**Day 5 of 8:**

**Preparation:** Chromebooks. Without Chromebooks, students will need paper and writing instruments but someone in the group must have internet access.

**State Standards:**

10.1.12 A. Evaluate factors that impact growth and development during adulthood and late adulthood. (acute and chronic illness, communicable and non-communicable diseases, health status, relationships, career choice, aging process, retirement)

10.1.12 B. Evaluate the factors that impact the body systems and apply protective/ preventative strategies (fitness level, environment (pollutants, available health care), health status, nutrition)

10.1.12 E. Identify and analyze factors that influence the prevention and control of health problems. (research, medical advances, technology, government policies/regulations)

10.1.9 E. Analyze how personal choice, disease, and genetics can impact health maintenance and disease prevention

**Type of instruction:** Cooperative learning, inquiry-based instruction, and graphic organizers

**Activity:**

5-10 minutes introduction: Today students will refer to the solutions they discovered from the previous 2 days of research. They will look at both the home and community solutions.

1. Discover ways to implement the solutions for causes of asthma in the home, including ease or difficulty of implementation.
2. Discover ways to implement the solutions for causes of asthma in the home, including ease or difficulty of implementation
3. They will research what steps need to be taken for these solutions including but not limited to the following: Who makes the decisions? How can they be contacted? What alternatives can be implemented? What is the timeframe and/or likelihood for the implementation?

Students will continue working on flip charts (either on paper or computer) with these topic headings. Under each heading, they will research and identify at least 5 responses for each area

35-40 minutes: Students work on the above areas and record their findings. As the teacher moves around the groups, help students refer to previous days' work, including graphic organizers, and offer suggestions where needed for how to connect the information.

10 minutes: Wrap up: Are students connecting their findings regarding causes with the solutions they are finding and creating? Let students know they will be tying their research into a presentation and begin to think about how they want to present their findings. Let students support each other with ideas for where to find answers.

**Day 6 of 8:**

**Preparation:** Chromebooks. Without Chromebooks, students will need paper and writing instruments but someone in the group must have internet access.

**State Standards:**

10.1.12 A. Evaluate factors that impact growth and development during adulthood and late adulthood. (acute and chronic illness, communicable and non-communicable diseases, health status, relationships, career choice, aging process, retirement)

10.1.12 B. Evaluate the factors that impact the body systems and apply protective/ preventative strategies (fitness level, environment (pollutants, available health care), health status, nutrition)

10.1.12 E. Identify and analyze factors that influence the prevention and control of health problems. (research, medical advances, technology, government policies/regulations)

Type of instruction: Cooperative learning, inquiry-based instruction, and graphic organizers

**Activity:**

5-10 minutes introduction: Today students will refer to the solutions they discovered from the previous 4 days of research.

Students will organize their findings into a slide presentation and prepare their research results. They can organize the students in a variety of ways: present all the causes of environmental factors in the home, community, and country, first. Then present all the solutions. They can present the factors and solutions for each area (home, community, and country). Or they can use a ‘case study’ for an individual and how these factors can affect an individual.

35-40 minutes: Students work on the above areas and record their findings. As the teacher moves around the groups, guiding students on how to tie in their information to make a cohesive 8-10 presentation (depending on class size)

10 minutes: Wrap up: Students sign up for the order of presentations for next class. Remind them to refer to the rubric before they present and be sure to quote their sources.

**Day 7 of 8:**

**Preparation:**

Smartboard (projector and screen if smartboard is not available), Chromebooks, or flip charts.

**State Standards:**

10.1.12 A. Evaluate factors that impact growth and development during adulthood and late adulthood. (acute and chronic illness, communicable and non-communicable diseases, health status, relationships, career choice, aging process, retirement)

10.1.12 B. Evaluate the factors that impact the body systems and apply protective/ preventative strategies (fitness level, environment (pollutants, available health care), health status, nutrition)

10.1.12 E. Identify and analyze factors that influence the prevention and control of health problems. (research, medical advances, technology, government policies/regulations)

10.2.12 E. Analyze the interrelationship between environmental factors and community health (public health policies and laws/ health promotion and disease prevention, individual choices/ maintenance of environment, recreational opportunities/ health status

10.1.9 B. Analyze the interdependence existing among the body systems

10.1.9 E. Analyze how personal choice, disease, and genetics can impact health maintenance and disease prevention

10.2.9 E Explain the interrelationship between the environment and personal health

**Activity:**

5-minute introduction: Today students will present their findings from their research. Students will have 8-10 minutes for presentation and 1-2 minutes for questions. It may take an extra day depending on how many students are presenting. The recommendation is for students who are not presenting to complete a short questionnaire about the presenters to keep them focused.

50 minutes: Students present slide decks to classmates. Refer to the rubric for grading. The teacher has flexibility with extra points for creativity, presentation skills, organization of slides, etc.

5 minutes: Closing and collection of papers written by observers.

**Day 8 of 8 (unless extra days were needed for presentations):**

**Preparation:**

Smartboard (projector and screen if smartboard is not available), Chromebooks, or flip charts.

**State Standards:**

10.1.12 A. Evaluate factors that impact growth and development during adulthood and late adulthood. (acute and chronic illness, communicable and non-communicable diseases, health status, relationships, career choice, aging process, retirement)

10.1.12 B. Evaluate the factors that impact the body systems and apply protective/ preventative strategies (fitness level, environment (pollutants, available health care), health status, nutrition)

10.1.12 E. Identify and analyze factors that influence the prevention and control of health problems. (research, medical advances, technology, government policies/regulations)

10.2.12 E. Analyze the interrelationship between environmental factors and community health (public health policies and laws/ health promotion and disease prevention, individual choices/ maintenance of environment, recreational opportunities/ health status

10.1.9 B. Analyze the interdependence existing among the body systems

10.1.9 E. Analyze how personal choice, disease, and genetics can impact health maintenance and disease prevention

10.2.9 E Explain the interrelationship between the environment and personal health

**Activity:**

5-minute introduction: Today teacher and students will review presentations and observations from classmates.

50 minutes: Students will discuss the projects with fellow classmates to review what challenges they faced, what went well, and what they can do to implement the solutions they discovered. Guide students in discussion and what next steps they would want to take about this topic.

5 minutes: Closing: What happens next? Proceed with what works for your class.

**Resources**

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## Appendix

### APPENDIX A: resources for students

Link to find air pollution comparison by zip code: <https://www.lung.org/research/sota>

Resources for students: <https://prceh.upenn.edu/programs-resources/>

### Success stories in other urban environments:

Green spaces and urban planning: Access to parks and clean, safe outdoor environments can help reduce the effects of asthma by improving the physical activity levels of children and adults.

Creating walkable neighborhoods:

<https://www.epa.gov/research-grants/niehsepa-childrens-environmental-health-centers-center-study-childhood-asthma-urban>

Health of the City: Resource for information on health disparities in Philadelphia

<https://www.phila.gov/media/20220718132807/HealthOfTheCity-2021.pdf>

Asthma surveillance CDC

Title: Asthma Surveillance — United States, 2006–2018

Corporate Author(s): Centers for Disease Control and Prevention (U.S.)

Published Date: 09/17/2021

Series: MMWR Surveillance Summaries /70(5)

URL : <https://stacks.cdc.gov/view/cdc/109086>

During 2006–2018, overall and by MSA category, current asthma prevalence among all ages (Figure 2) and adults did not change significantly (Supplementary Tables 3 and 23, <https://stacks.cdc.gov/view/cdc/109086>). However, among children, a decrease occurred in the overall trend, not considering MSA categories, in asthma prevalence (annual percent change [APC] = -1.6) and the trend in small MSAs (APC = -1.5). In addition, during 2011–2018, asthma prevalence decreased among children in large MSAs (APC = -4.0).

Current asthma prevalence was lowest among children aged 0–4 years (4.0%) and highest among those aged 12–17 years (10.5%). Among all ages, the prevalence was higher among Black persons (10.7%) and persons of multiple races (13.1%) and lower among Asian (4.5%) and Hispanic persons (6.5%) than among White persons (8.0%) (Figure 1) (Supplementary Table 1, <https://stacks.cdc.gov/view/cdc/109086>). Among Hispanic persons, Puerto Rican persons had a higher prevalence of asthma (14.0%) than Mexican (5.4%) and other Hispanic persons (6.3%) (Figure 1) (Supplementary Table 1, <https://stacks.cdc.gov/view/cdc/109086>).

Resources for prevention and education in Philadelphia:

<https://prceh.upenn.edu/focus-areas/asthma/#asthma-triggers>

## **Appendix B: Summary of Lessons for teachers with Pennsylvania State Standards**

### THE PENNSYLVANIA STATE STANDARDS:

The following are the Pennsylvania state standards that the lesson plan connected with my research project will cover:

10.1.12 A. Evaluate factors that impact growth and development during adulthood and late adulthood. (acute and chronic illness, communicable and non-communicable diseases, health status, relationships, career choice, aging process, retirement)

10.1.12 B. Evaluate the factors that impact the body systems and apply protective/ preventative strategies (fitness level, environment (pollutants, available health care), health status, nutrition)

10.1.12 E. Identify and analyze factors that influence the prevention and control of health problems. (research, medical advances, technology, government policies/regulations)

10.2.12 E. Analyze the interrelationship between environmental factors and community health (public health policies and laws/ health promotion and disease prevention, individual choices/ maintenance of environment, recreational opportunities/ health status)

10.1.9 B. Analyze the interdependence existing among the body systems

10.1.9 E. Analyze how personal choice, disease, and genetics can impact health maintenance and disease prevention

10.2.9 E Explain the interrelationship between the environment and personal health

### **The Overview of the Lesson Plan 9-12**

**This is a summary of the entire outline. Following the summary will be the expanded lessons for each day.**

This set of lessons will take approximately 8- one-hour classes. Each lesson number represents one full day of lessons. The entire set will cover the standards above. Students will work collaboratively in pairs or groups of three to create their asthma awareness and reduction program.

### **Lesson Outline:**

**By the end of each lesson series, students will be able to reach the following outcomes:**

1. Initial ideas will be brainstormed based on what they already know. Students will begin to research childhood asthma and by the end of the period, they will be able to define childhood asthma. They will also be able to identify the percentage of children affected in the United States versus the percentage of children in Philadelphia and report their findings.
2. Students will be able to research the causes of asthma, both genetic and environmental. They will identify what causes cannot be controlled by individual choice versus what health decisions an individual or family can make.
3. They will start to formulate their ideas on which environmental causes are within the homes of Philadelphia residents. They will find a minimum of 5 sources. What can exacerbate asthma in the home and what can be removed or replaced to mitigate asthma flare-ups?
4. Students will be able to identify at least five environmental causes of childhood asthma in the Philadelphia community at large. Other than physical causes, are there socio-economic causes or issues with access to health care? They will also compare these causes, to those of the country in general.

5. Students will be able to identify a minimum of five solutions to the environmental causes in the community. They will discover ways to implement these solutions, including ease or difficulty of implementation. They will research what steps need to be taken for these solutions including but not limited to the following: Who makes the decisions? How can they be contacted? What alternatives can be implemented? What is the timeframe and/or likelihood for the implementation?
6. Students will organize their findings into a slide deck presentation and will prepare their research results.
7. Students will present their findings to the class. They will take notes on their classmates' presentations.
8. Students will discuss the projects with fellow classmates to review what challenges they faced, what went well, and what they can do to implement the solutions they discovered.

**Learning Objectives: By the end of the series of lessons, the following will occur:**

Students will be able to understand terminology related to childhood asthma.

Students will discover environmental and genetic causes for childhood asthma, both in the United States and in Philadelphia.

Students will be able to create surveys for research purposes.

Students will be able to graph responses to surveys and connect results with research.

Students will be able to provide multiple solutions for environmental causes of asthma, both in homes and in the larger community.

Students will be able to present their findings in an organized, effective manner.

**Assessment:**

Students will record and report their findings each day at the end of the class period as part of their exit ticket. As they work towards their presentation completion, students will share rough drafts with the teacher for feedback.

The culmination of the project will result in a slide deck presentation that has included the following sections to receive full credit:

1. Definition of childhood asthma
2. Percentage of cases in Philadelphia versus the United States at large
3. Environmental and genetic causes
4. Is childhood asthma caused by individual and/or family choices?
5. 5 environmental causes of childhood asthma related to homes
6. 5 solutions for the causes within homes
7. 5 environmental causes of childhood asthma related to the Philadelphia community at large

8. 5 solutions for the environmental causes in the community
9. Ability/ likelihood for causes to be implemented
10. Other factors not considered above such as socioeconomic status or healthcare access

Students will be graded on the 10 areas above. They will also be graded on the neatness of the slide deck, the organization of the presentation, and the ability to speak to the audience in a clear, concise manner. Creativity will add bonus points. The appendix will show my rubric and grading system but it may be adjusted for your grading process.

**Vocabulary terminology:**

Students will be able to define the following vocabulary terms: asthma, pollution, lungs, particles, toxins, environment, health promotion, disease, urban, aerosols, chronic illness, and non-communicable diseases.

**Differentiation:** Students may opt for only oral presentation or visual presentation in accordance with their IEPs.