Air Quality in Brownsville
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Abstract
Air pollution is a serious problem in Brooklyn. It causes many illnesses, including asthma, lung cancer, emphysema, etc. This project was aimed at measuring air pollution levels in Brownsville, Brooklyn. Experiments 1 and 2 were aimed to estimate the levels of PM10 and determine the local hotspots and critical time periods of PM10 elevation. Experiment 3 was aimed to study the acidity levels of rain in order to estimate the levels of sulfur dioxide in Brownsville. Experiment 4 was aimed to determine how air pollution affects general visibility. It was found that PM10 levels were higher near the train station than near the park (Experiment 1) and that they were higher on a weekday than on a weekend (Experiment 2), since traffic volume is higher at these times and in that location. In addition, two out of three samples showed evidence of acid rain suggesting the presence of sulfur dioxide in the air (experiment 3). Finally, it was found that air pollution greatly affected visibility levels (Experiment 4). Clearly, air pollution is a problem in Brownsville and clean air reform is needed in order to prevent further air pollution.

Experiment 1

- Particulate Matter: tiny particles that are suspended in the air or liquid. PM10 are particles smaller than 10 micrometers. They are particularly dangerous since they can actually enter the lungs and cause asthma, lung cancer, heart disease and death. This experiment was set up to determine the location of the highest PM10 particles in the air. It was predicted that more PM10 would be found near the train station than in the park since there is more traffic near the train station.

Methods
- 4 slides were placed in 2 different locations: 2 were placed in the park and 2 were placed near the train station.
- All slides were kept for only three days (in order to equate the duration on weekend and weekday).
- Particulate matter was sampled using a Prosop (100 times magnification) and particles that were smaller than 10 micrometers were counted and averaged across the slides in the same location.

Results and Conclusions

More PM10 particles were found near the train station than near the park, suggesting that there is more dangerous air pollution near the train station. This was not surprising since there is more traffic near the train station than in the park.

Experiment 2

Results

- The results on the left indicate that there was more PM10 on a weekday than on a weekend. This is most likely due to higher traffic volume on a weekday than on a weekend.

Methods

- The methods were identical to those of Experiment 1 with the following exceptions:
  - The slides were placed for only three days at a time (in order to equate the duration on weekend and weekday).
  - The weekend slides were placed on a Tuesday and removed on a Friday morning.

Experiment 3

Methods

- Rain samples were collected on the rooftop of the school and local buildings. A pH meter was used to measure the acidity of water. A pH lower than 7 is acidic, a pH level higher than 7 is basic (or alkaline).

Results

- The results demonstrated that the samples were acidic, suggesting that there is acid rain in Brownsville. The red color indicates samples that were more acidic, less red samples were less acidic.

Experiment 4

Methods

- This study aimed to study how air pollution affects visibility. It is known that air pollution can affect visibility on otherwise clear days, making the streets look foggy. For example, air pollution was very bad in China prior to the Olympics because of factories, cars, coal plants and weather. However, when China lowered sulfur dioxide and other emissions prior to the Olympics, the visibility in Beijing became much better.

Results

- The pictures above show the visibility on two different days when the air pressure and humidity were roughly the same. However, on one of the days the Verrazano bridge was visible (right) and on the other day it was not visible (left). These results suggest that air pollution can alter visibility.

General Conclusions

- The results of these experiments suggest that there is an air pollution problem in Brownsville. Experiment 1 found that there was a lot more PM10 near the train station than near the park. Experiment 2 found that there was a lot more PM10 on the weekdays than during the weekend. Both of these experiments show that traffic affects the PM10 levels and can potentially be hazardous to our health. Experiment 3 found evidence of acid rain in Brownsville, which is alarming because it means that our plants and animals may be affected. Experiment 4 showed that air pollution can affect visibility on otherwise clear days. All of these studies show that clean air reform is needed in order to fix the air pollution problem in Brownsville.

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