

Analyzing Particulate Pollution

Imagine standing at a bus stop as a bus pulls away from the curb. What do you see and smell as the bus drives away? The black, foul-smelling clouds of exhaust produced by buses and trucks are composed of particulates—solid particles or drops of liquid suspended in air. Some particulates, such as smoke and dust, are visible to the unaided eye. But particulate air pollution also contains many microscopic particles, such as ash, pollen, mold spores, and bacteria.

In this activity, you will determine the extent of particulate pollution in your community by collecting air particulates from different locations. Then, you will analyze your data and determine where the heaviest particulate pollution in your community exists. Finally, you will identify ways to reduce particulate pollution.

OBJECTIVES

Predict where to look for particulates in your community.

Gather data about particulates in designated areas.

Decipher where most particulate pollution exists in your community.

Recommend ways to reduce particulate pollution.

MATERIALS

- air quality information from a local newspaper
- Data Collection Form, copies
- map of your community
- markable microscope slides (4–8)
- masking tape
- microscope
- petroleum jelly
- plastic slide cases (4)
- sample slides provided by your teacher



Procedure

PART I—CONDUCT A PRELIMINARY AIR-QUALITY ASSESSMENT

1. Your local library may provide sources of air quality information that can help you predict the kinds of particulates in your area. Below is a sample data graph from a newspaper.

Allergen Forecast

	Low	Medium	High
Fall Elm			
Grass			
Ragweed			
Molds			

Analyzing Particulate Pollution *continued*

2. Study the air quality information from the local newspaper. What does it tell you about the air quality in your area?

3. With a group of your classmates, discuss where the highest levels of outdoor particulates might be in your community. Look at the map of your community to help pinpoint particular areas. List your predicted high pollutant areas below, and indicate those areas on the map.

4. Explain why you identified the sites in step 3 as areas of potentially high particulate pollution.

PART II—MAKE A PARTICULATE COLLECTOR

5. Select two different test sites in your community, and write your initials at these locations on the map. Have each group member test a residential and a commercial area. Be sure that there is no site duplication in your group.
6. Write the date and your initials on the markable portion of each of your slides.
7. Lightly smear the specimen side of each slide with petroleum jelly. Transport your slides in a slide box to avoid smearing the petroleum jelly.
8. Place a slide in each designated location, and secure the slide with a bit of masking tape. The slides should be placed vertically. Record the location and the corresponding slide number in your notebook. Leave the slides in place for at least 48 hours.
9. After 48 hours, return to your slide. Be prepared for the possibility that your collector may not be there. Interference with data collection, whether deliberate or accidental, happens to scientists. Complete part I of the Data Collection Form for each slide, and bring your slides and completed forms to class.
10. Your teacher will provide sample slides of common particulates, such as grass pollen, tree pollen, household dust, soil particles, and smoke particles from soot, to help you identify particulates on your group's slides. Examine the particulates on your slides with a microscope, and complete part II of the Data Collection Form for each slide.

Analyzing Particulate Pollution *continued*

Analysis

- 1. Analyzing Data** Compare your data with the data collected by the rest of your group and with other members of the class. Which types of locations produced the most particulate pollution? Explain why you think particulate pollution was the greatest in these places.

- 2. Analyzing Data** Which location registered the lowest level of particulate pollution? Explain why you think that is the case.

- 3. Analyzing Data** Which particulates were the most abundant? In your test results, how do you explain the abundance of certain particulates?

Conclusions

- 4. Drawing Conclusions** What are some possible negative effects of the particulate pollution in the areas you tested?

- 5. Applying Conclusions** What steps can you recommend to reduce particulate pollution in your community?

Analyzing Particulate Pollution *continued*

Air Pollution Data Collection Form

I. PLACING THE COLLECTOR

Placement site: _____

Possible pollution source(s): _____

Distance of possible pollution source(s) from collector: _____

Describe the conditions in the area where you placed the collector.

a. Date and time of placement: _____

b. Wind conditions: _____

c. Traffic levels (pedestrian and vehicular): _____

d. Direction that the sticky side of collector is facing: _____

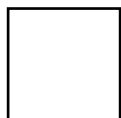
e. Height above ground: _____

f. Other factors that may affect results: _____

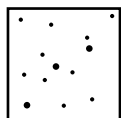
II. CHECKING RESULTS

a. Date and time of collection: _____

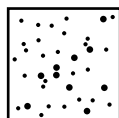
b. The particulates on my collector were (circle one):



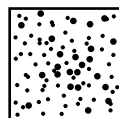
None



Light



Moderate



Heavy

c. Describe the appearance of the particulates you collected.

d. Identify the particulates in the sample.

