

The Pollution Detectives, Inc.
1012 Westlake Drive, Kannapolis, NC 28081
info@thepollutiondetectives.org
904-616-8024 (P); 704-934-2082 (F)

Protocol for Surveying Indoor Air Quality in Schools

Introduction

The Pollution Detectives is a North Carolina 501(c)(3) not-for-profit which educates citizens about threats to human health by “making the invisible visible.” One of our focus areas is pollution inside schools. For background information on this issue, please visit [Right Under Our Noses](#).

To aid students, teachers and administrators in measuring pollutants, we lend a variety of detection devices. Each piece of equipment we lend is worth approximately \$2,000, so we want to make sure you operate it prudently.

The purpose of this document, therefore, is to explain how to sample air inside a school correctly and with care. **It is not intended to explain the social policy or the science behind this project.** For a detailed history of those issues and the huge opportunity to improve America’s schools, see a document on our website entitled [Startling Facts About Pollution in Schools](#).

Steps to Sampling Indoor Air Quality

These are the steps you should take to successfully sample a school’s Indoor Air Quality:

- 1) **Use the form below entitled “Attachment One”** to provide to us **the complete contact information for an adult who is either an employee of the school system, or the student’s parent or guardian.** Fill in all the required fields and the form. In Step 7 you will return this form to us, along with other items, using the contact information at the top of this document.

We use email a lot in this process, and require that communication sent to any student younger than 18 also be copied to the individuals named on Attachment One.

- 2) **Obtain a copy of the building’s blueprint, or make a sketch of it.** Talk to your building maintenance staff about the design of the school’s heating, ventilation and cooling (HVAC) system, as it is depicted on the blueprint. **Read the descriptions of different HVAC (sometimes referred to as “air-conditioning”) systems, below, to determine in which classrooms you will sample air quality with monitors.**

As you examine your blueprint, you may encounter one or more of the following HVAC designs:

- a. **A single large HVAC system** can have a number of air pipes or ducts that service different parts of the building. For example, classrooms on the left side of a hallway may have different piping or ductwork to carry the air than classrooms on the right side of the same hallway. In a surprising number of cases, even though the air conditioning was all done by one big central machine, some classrooms are great, and others across the hall are not.

This has to do with various internal parts and pieces that may need adjustment. **For this reason, with a unified HVAC system, plan on sampling classrooms from both sides of a hallway.**

b. In other cases, your school air-conditioning equipment may have half a dozen distinct “trees,” each with its own central “trunk,” or central unit, along with many “branches” to hallways and classrooms. **To adequately address this design, monitor the first and last room on every branch of the tree.**

c. And in still other cases, each classroom has its own individual air conditioner. Schools with this design require samples from the greatest number of classrooms, since air quality is contingent upon the effectiveness of each individual unit.

Regardless of the air-conditioning design in your school, make sure you obtain adequate samples from all systems. In addition to classrooms, the rooms you sample may include administrative offices with potentially poor air quality, if consistent with your project’s scope. Do not plan on monitoring dining halls or gymnasiums.

3) **In keeping with the above explanations, on the copy of your blueprint, mark the following:**

a. the central HVAC, or air-conditioner (the “tree”);

b. hallways and classrooms that are “branches” of the tree; and

c. the classrooms or administrative offices in which you intend to put monitors.

4) **Count the number of monitors** needed for the duration of your survey, and **write this number, and the time period for which they will be used, on the blueprint** (e.g.’s, “10 monitors for one week” or “5 monitors for two weeks” or similar).

It takes a minimum of 5 classroom days for each sample to be taken. For example, you can install on Friday afternoon, and remove the following Friday, or install on Monday and remove on Friday. Depending on the size of your school, and the availability of monitors from our inventory, it may take as little as a week, or as long as a month (4 sampling weeks) to collect a suitable amount of data to gain insights which will help improve student learning.

5) **Develop a Goal Statement.** Write a description of your goals, including the number of air-conditioning systems you will monitor, the number of classrooms, and the ideal timeframe for achieving them.

An example of this goal statement might be “We intend to monitor indoor air quality for 2 different air conditioning systems serving the Bill Nye Middle School located in Westport, Tennessee. The school has 36 classrooms, and we intend to sample air quality in 10 of them. The optimal time to sample is the weeks between February 29 and April 15, 2024. The monitors will be placed and removed by the school’s STEM club, led by Ms. Jane Smith, a Junior STEM student, under the supervision of Ms. Harriet Jones, Ed.D., Chairperson, Science Department.”

- 6) **Complete Attachment Two.**
- 7) **Return Attachments One and Two, and your marked blueprint (or sketch),** to The Pollution Detectives, Inc. You can scan and email attachments to thepollutiondetectives@gmail.com, fax them to 704-934-2082, or send them by first class mail to the address above.
- 8) After we have received Attachment One, Attachment Two, and your marked blueprint (or sketch), we will send you the monitors you requested, along with a receipt that will list these monitors by serial number. **Attachment Three** provides an example of the receipt. **When you receive the real receipt, sign and date the [blue](#) portion. Scan and email the receipt, or fax it, or send a paper copy** to The Pollution Detectives, Inc., using the contact information at the top of this document.
- 9) **Place your monitors** in your designated rooms by following these instructions:
 - a. Note that each monitor, regardless of manufacturer, has a small fan, a place where air is sucked in, and after electronic sampling, another place where air is pushed out. This goes on continuously. It is vital that there be no external blockage of either intake or exhaust.
 - b. Monitors should be placed about waist high, away from windows, copy machines, laboratory Bunsen burners, and other mechanical or electrical devices that would falsely present the overall average air quality in the room. Avoid placing monitors within 4” of an air intake or exhaust vent in the room.

Attachment Four provides an example of effective placement.

- 10) After placement, **take a photograph of each monitor in its exact location.** All monitor placements must be documented by photos (which should not include children’s faces). **Each photo should include a post-it note beside the monitor with the following information: school name, date of placement, teacher’s name, classroom number, and serial number of the monitor. Attachment Four provides an example of a photo with the required information.**

Email your photos to us using the contact information at the top of this page.

We will set up a secure page for your school on Google Drive, and grant you access to it. Your photos will be included with this page. Throughout your survey, you will use this page to document, save, and review all of the data provided by your meters.

- 11) As you measure the air quality in your school, you may need to relocate an air monitor to a new classroom to begin another survey. When this occurs, **document the equipment’s new location by completing the Placement Log in Attachment Five.**
- 12) **When you finish your monitoring,** mindful of the value of the equipment we have lent to you, check to make sure you are returning everything we sent. **Sign and date the [black](#) portion of the receipt you filled out in Step 8. Attachment Three** provides an example.

Scan and email the receipt, or fax it, or send a paper copy to The Pollution Detectives, Inc., using the contact information at the top of this document. This will comfort both of us.

Finally, enjoy your investigating! Do not hesitate to contact us with questions or concerns!

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ATTACHMENT ONE
CONTACT INFORMATION FOR THE INDIVIDUALS CENTRAL TO THIS PROJECT

Primary Investigator(s) (Lead Student Placing Monitors, Managing Data, Preparing the Science Fair Project, etc.)

Name(s)

Personal Telephone

Address for First Class Mail

Email Address

School or Institution

School Address

School Main Phone Number

URL or Web Address of School

Adult Liaison at the School (Supervisor of Students' Work)

Name

Personal Telephone

Address for First Class Mail

Email Address

Relationship to Student (Parent, Teacher, Science Club Mentor, etc.)

School or Institution

School Address

School Main Phone Number

URL or Web Address of School/Institution

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**ATTACHMENT TWO
INDOOR AIR QUALITY MONITORING PLAN**

Goal Statement

Write your Goal Statement here.

Scan and email your Goal Statement and marked blueprint, fax them, or mail them to The Pollution Detectives, Inc., using the contact information at the top of this document.

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**ATTACHMENT THREE
EQUIPMENT RECEIPT**

When you take possession of an air monitor from The Pollution Detectives, Inc., please complete the **blue** portion of the form below. **Scan and email the form, or fax, or send by regular postal service, to The Pollution Detectives, Inc.,** using the contact information at the top of this document.

When you relinquish possession of an air monitor to The Pollution Detectives, Inc., please complete the **black** portion of the form below. **Scan and email the form, or fax, or send by regular postal service, to The Pollution Detectives, Inc.,** using the contact information at the top of this document.

POSSESSION OF AN AIR MONITOR

SCHOOL NAME:

PRIMARY INVESTIGATOR NAME AND PHONE NUMBER:

PRINCIPAL/FACULTY MEMBER NAME AND PHONE NUMBER:

I, _____, confirm that on the date indicated
Print Name
below I received from The Pollution Detectives, Inc., the air monitors listed in the following table.

Signature

Date

RETURN OF AN AIR MONITOR

I, _____, confirm that on the date indicated below I shipped
Print Name
or delivered to The Pollution Detectives, Inc., the air monitors listed in the following table.

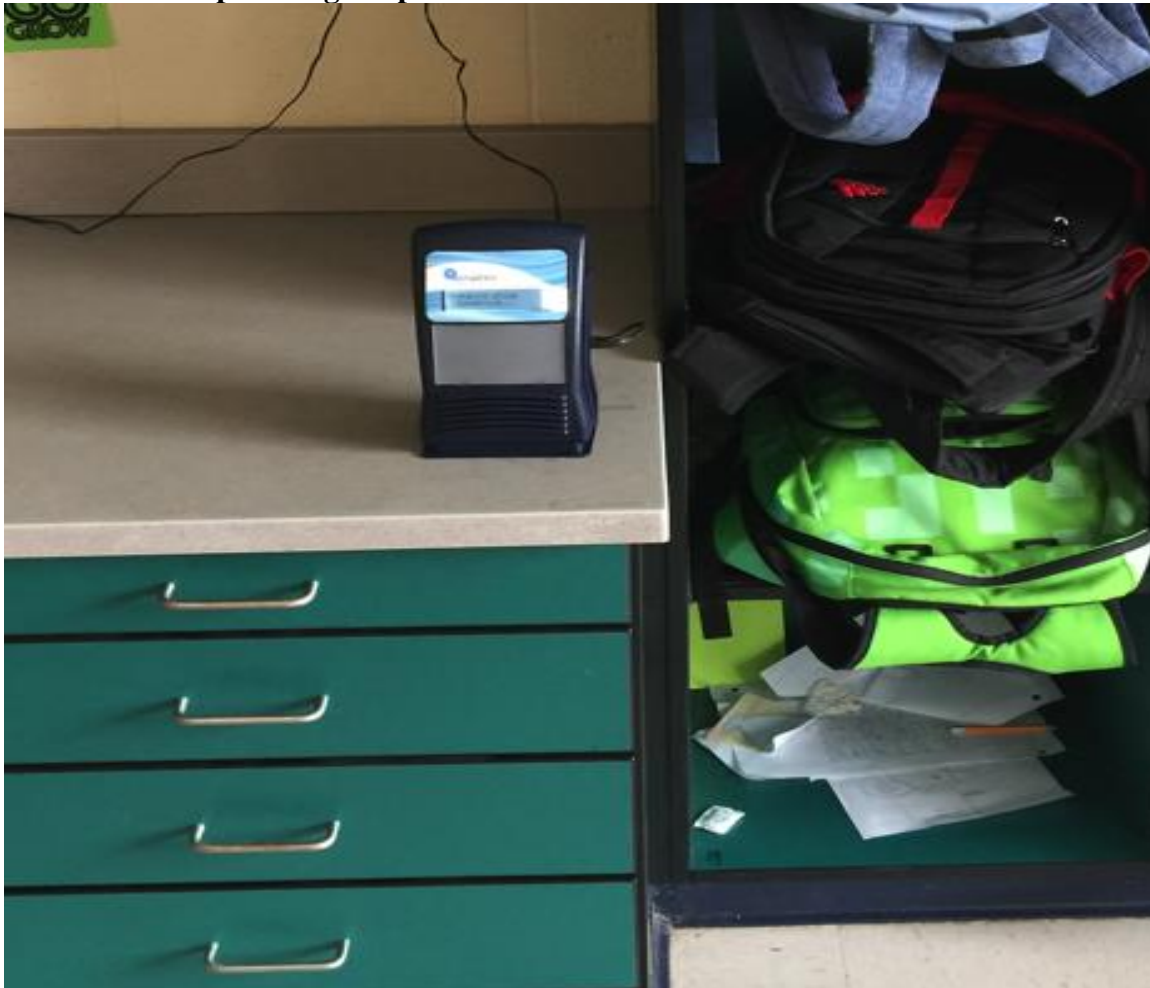
Signature

Date

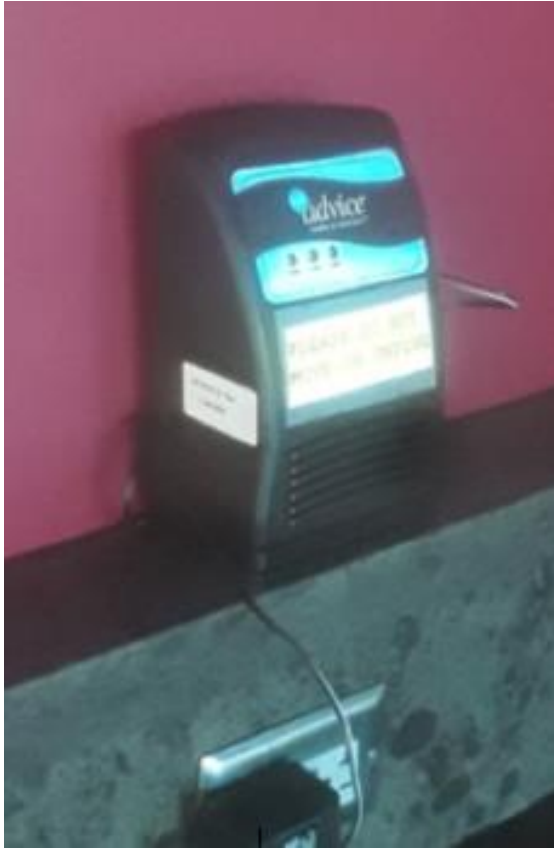
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**ATTACHMENT FOUR
DOCUMENTING MONITOR PLACEMENT**

This is an example of a good placement.



Here are two examples of bad placement. In the first, you can see that the back vent, where air is supposed to exit the monitor, is blocked. In the second photo, the monitor is placed on top of some device that is likely to influence monitor readings.



(Attachment Four, continued)

Photos

All monitor placements must be documented by photos (which should not include children's faces). **Each photo should include a post-it note beside the monitor with the following information: school name, date of placement, teacher's name, classroom number, and serial number of the monitor.**

This is a good example of an air monitor photo taken at the location of placement, with all the required information.

