



# Schools Indoor Air Project (ScIP): What is being measured and why is it important?



## Particulate Matter (PM): What is it?

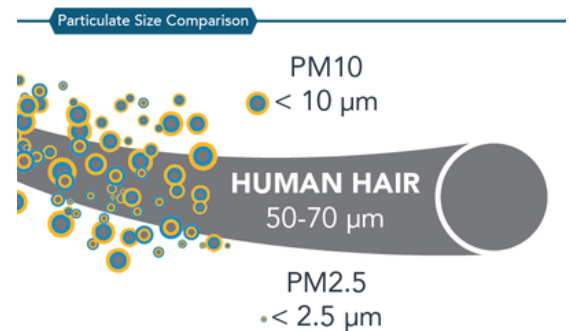
The US Environmental Protection Agency (EPA) and states like Michigan protect outdoor air quality. However, there is little protection for indoor air quality despite plentiful research showing its importance for health and learning. Children's health is more strongly impacted by breathing poor quality indoor air than adults breathing the same air.

Students spend about half of each year in a classroom. Clean indoor air in schools is critical to children's health and academic achievement. For this reason, Community Action to Promote Healthy Environments (CAPHE) has started the School Indoor Air Project (ScIP) to improve indoor air quality in childcare settings in Detroit and surrounding areas.

Airborne **particulate matter (PM)** is a mixture of solid particles and liquid droplets found in the air. It is measured in two sizes: very small particles (**PM<sub>2.5</sub>**) and larger particles (**PM<sub>10</sub>**).

- PM<sub>2.5</sub> can come from smoke and vehicle exhaust
- PM<sub>10</sub> includes dust, pollen, mold, soil, and liquid droplets.

The US currently does not have rules for limiting indoor levels of PM in schools and most other buildings. There is an outdoor limit for PM<sub>2.5</sub>.



## Why is it important?

Breathing in PM is a leading cause of childhood asthma. PM can be drawn deep into the lungs and enter the bloodstream. This creates health risks, especially for children. Exposure to PM<sub>2.5</sub> increases the chances of:

- Lung irritation
- Coughing
- Difficulty breathing
- Decreased lung function
- Damage to lung growth

In addition, it can impact children's learning by increasing school absences due to illness and affecting the ability to concentrate in class.

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## Black Carbon (BC): What is it?

**BC** is a portion of  $PM_{2.5}$  that is mostly produced from diesel engine exhaust and burning wood. The US does not have regulations that limit BC levels.

### Why is it important?

BC is primarily used to identify the sources of PM. At schools, this can include emissions from trucks and school buses. Tailpipe emissions from vehicles can enter the school and expose children. This can contribute to health issues and the inability to focus in classrooms.



\*child with asthma inhaler

## Air change/Ventilation Rates: What is it?



The **air change rate** is the number of times air enters and exits the room per hour. The recommended range for classroom air change rates is 3-6 times per hour. Higher rates can provide additional benefits to the classrooms.

### Why is it important?

Changing indoor air reduces exposure to pollutants from indoor sources and keeps the air fresh. There are many indoor sources of air pollutants, such as:

- Building materials
- Consumer products
- Pesticides
- People

## Temperature & Humidity: What is it?

Appropriate temperature and humidity levels help people feel comfortable in their environment. For example, children that are too hot or too cold have a hard time focusing on their schoolwork. Recommended classroom temperature levels range from about 68°F to 75°F and humidity levels between 30% and 50%.

### Why is it important?

Uncomfortable temperature and humidity levels can make it hard for students to focus on schoolwork and learning. In addition to discomfort, very high humidity can lead to mold growth, which can cause other health issues for students.



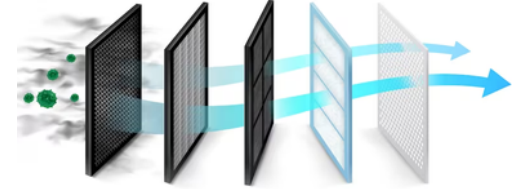
## Carbon Dioxide (CO<sub>2</sub>): What is it?



**Carbon dioxide (CO<sub>2</sub>)** is a gas produced by burning fossil fuels and by people and animals when they exhale. Indoor levels come mostly from people breathing in the space and from outdoor sources. CO<sub>2</sub> levels increase in crowded and poorly ventilated spaces. The recommended limit for CO<sub>2</sub> levels in schools is from 800 to 1000 parts per million (ppm). The CO<sub>2</sub> level is a key indicator of the air change rate.

### Why is it important?

High indoor CO<sub>2</sub> levels indicate that a space is not well-ventilated. While CO<sub>2</sub> is not harmful at typical levels, recent research has linked CO<sub>2</sub> above 2,500 ppm levels to poorer brain function and decision-making skills.



\*multistage filter to remove large and small particles



## Sound Level: What is it?

High noise levels and poor classroom acoustics can interfere with student learning by reducing students' ability to hear the teacher and classmates. Noise levels that are too high over a length of time can make the classroom environment unpleasant, difficult to work in, and damage hearing and health. Suggested limits for background sound levels in a classroom are 35-45 decibels (dB), typically the sound of a library.

### Why is it important?

Excessive noise levels in a room can impact students' learning. Noise such as people talking, outside sources, instructional equipment, air conditioning, heating units, and fans can be distracting.

## What is Community Action to Promote Healthy Environments (CAPHE)?

Our goal is to use scientifically-based and community-led actions to reduce air pollution and harmful health effects from air pollution in Detroit and surrounding communities.

CAPHE's partnerships include community-based organizations, residents, health providers and public health researchers.

## CAPHE Partners:

- 48217 - Theresa Landrum
- Community Action Against Asthma
- Detroit Community-Academic Urban Research Center
- Detroit Health Department
- Detroit Hispanic Development Corporation
- Detroiters Working for Environmental Justice
- Eastside Community Network
- Ecology Center
- Great Lakes Environmental Law Center
- Green Door Initiative
- Healthy Environments Partnership
- Michigan Department of Environment, Great Lakes, and Energy (EGLE)
- Southwest Detroit Community Benefits Coalition
- Southwest Detroit Environmental Vision
- University of Detroit Mercy School of Law
- University of Michigan School of Public Health
- University of Michigan- Dearborn