
Sensing
Air Quality

For most of history, the quality of our air was unmonitored and its effects on health were unknown to the public. Clean air was always assumed, but the **Industrial Revolution** between 1760 and 1840 changed that. City populations grew and factories, cars, and powerplants began buring much more coal and petroleum to power the industry.

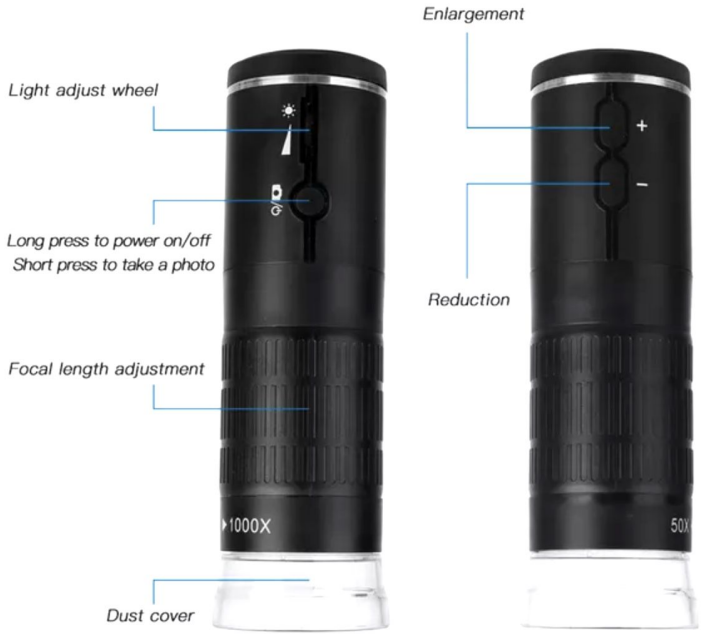
In 1970, the **Environmental Protection Agency (EPA)** and the **Clean Air Act** were created by the US federal government to study and reduce air pollution in American cities. This act is believed to be the most important environmental regulation ever passed in the US.

Now with digital technology and Neighborhood Science we can monitor the air quality of our local environment and make changes to improve the air that we breathe. Two tools we can use to sense air quality are a **digital microscope** for viewing particulate and the **AirBeam** air sensor.

A **digital microscope** is a camera with lenses specifically designed to view things at a magnification of 50X to 1000X that of the human eye. At this small scale, we can begin to see and identify the particulate that enter our lungs when breathing.

Instructions - how to capture air pollution particles for viewing

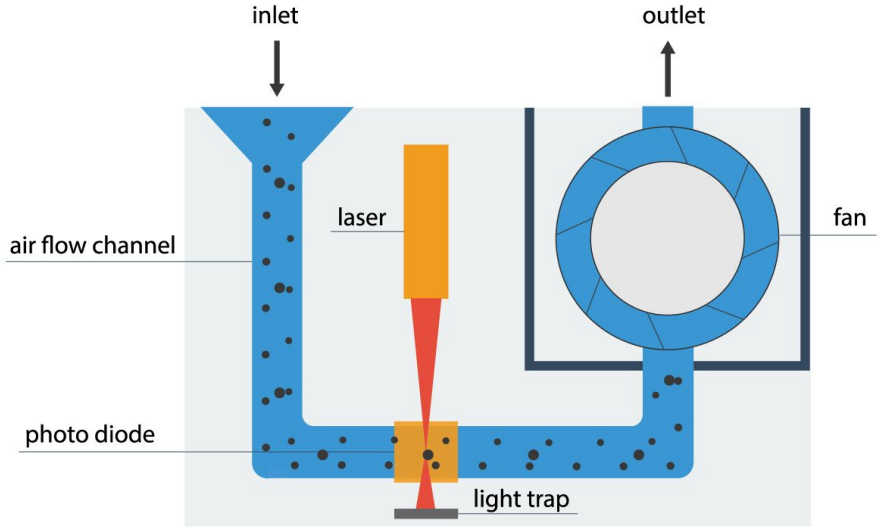
Instruction - how to use the digital microscope

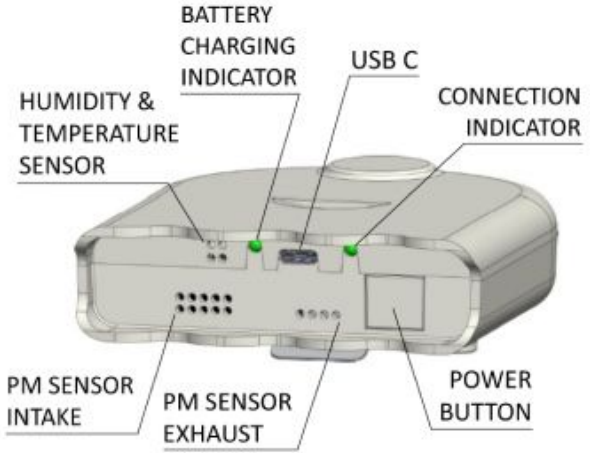


How do the different particle sizes you are seeing impact our bodies differently when we breathe them in?

Where do you think these particles came from?

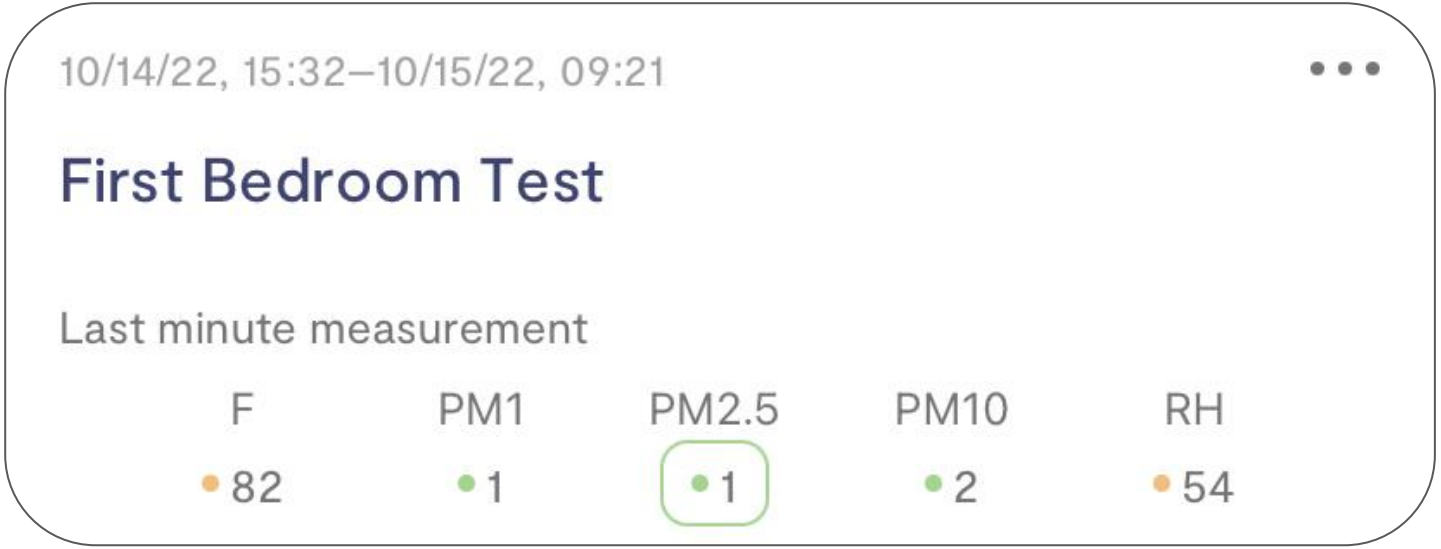
The **AirBeam** sensor is an air quality instrument that measures particulate matter (PM_1) ($PM_{2.5}$) (PM_{10}) temperature, and relative humidity. A beam of light inside the sensor is passed through a sample of air, and particles in the sample scatter the light beam. The scattered light is measured and used to calculate the concentration of particles in the air sample.





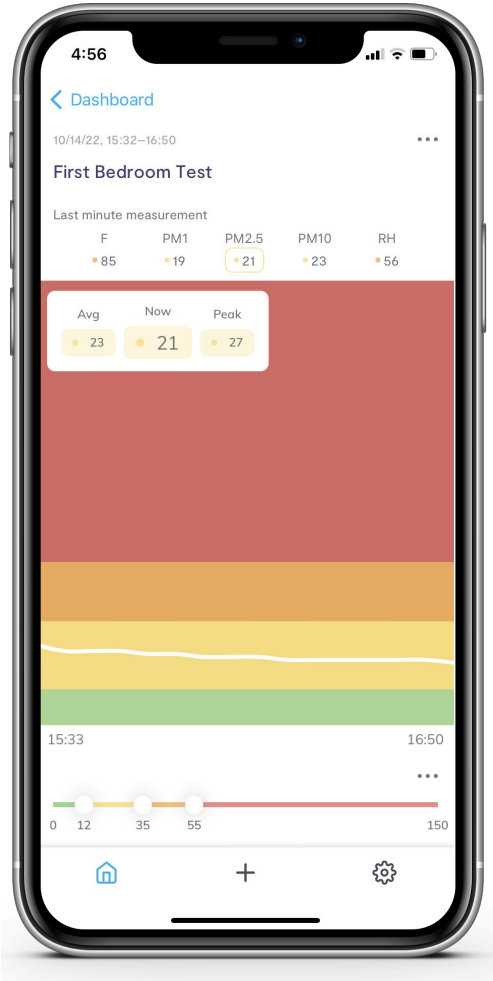
Instructions - monitor air quality as you move around outdoors with an AirBeam Mobile Session

Instructions - monitor air quality in your room with an AirBeam Fixed Session



Temperature (F) **Particulate Matter (PM_{1-10})** **Relative Humidity (%)**

What is the difference in the information we obtain looking through the digital microscope from the information we obtain from the AirBeam?



Measuring and understanding air quality is the first step toward improving the quality of what we breathe.