Citizen Science Kit:
MONITORING AIR QUALITY

## Measure particulate levels indoors or outdoors.

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This kit provides resources and instructions to help you monitor the quality of the air you breathe indoors or outdoors. By using a combination of a portable instrument and free mobile app, you can measure the level of harmful microscopic particles (particulate matter) in the air as well as humidity and temperature.

WHY THIS MATTERS

Particulate matter (PM) is made up of microscopic particles in the air. When you inhale them, they could cause serious health problems in your lungs and throughout your bloodstream. Do you know your personal exposure risks when it comes to the air you breathe? By monitoring your PM exposure using the AirBeam instrument, app, and platform featured in this kit, you can make informed, healthier decisions about your daily route and routine while providing data for environmental research and public policy.
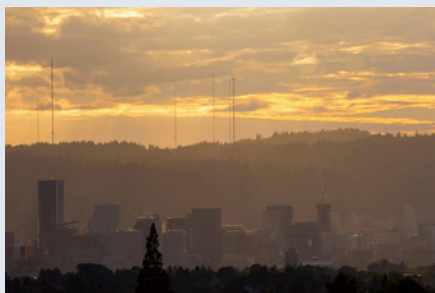
iStock

KIT COMPONENTS

AirBeam3 air quality instrument with charging cable and carabiner clip

REQUIRED, BUT NOT INCLUDED

Smartphone or **tablet**
AirCasting App
Wi-Fi or **cellular data**

PREPARE

STEP 1: Scan this QR code or visit **cfpl.info/airquality** for an online version of these instructions, how-to videos, and other resources. This is also where you can **create your free SciStarter account** (optional) if you haven't already. SciStarter is an online citizen science hub connecting millions of people from all walks of life to thousands of opportunities to participate in citizen science.

STEP 2: Make sure your smartphone or tablet and AirBeam are fully charged. The AirBeam allows you to take a reading either inside or outside, where the AirCasting app provides real-time measurements.

STEP 3: Download the "AirCasting | Air Quality" app from the Apple App Store or the Google Play Store. It's important that you open the AirCasting app first, and then turn on the AirBeam for the two devices to pair through Bluetooth.

KEY TERMS

Particulate matter: harmful microscopic particles in the air formed from things like vehicle exhaust, factories, construction sites, and even unpaved roads

HabitatMap: an online open-source data visualization map allowing users to see data uploaded by participating citizen scientists

AirCasting: an open-source data platform consisting of an app and online mapping system

AirBeam: an air quality instrument that measures concentrations of particulate matter, humidity, and temperature around you

PLAN

STEP 4: Plan on where and when you will take a reading. Decide if you will gather data while the AirBeam is stationary (Fixed) or while you are moving (Mobile active). Think about how you will name and tag your session. Neither are required, but they will help in finding your data later on the AirCasting map website, especially if you are creating a study of an area over time.

Another consideration is if you will record one session for several days or several sessions in one day. It's important to keep your smartphone app within 10–20 feet from the AirBeam to maintain the Bluetooth connection and receive data from the AirBeam. Data will automatically download from your app to the HabitatMap.

PARTICIPATE

STEP 5: The AirBeam instrument should already be paired with your device app (see Step 3 above). **Now you're ready to make and share your observations!** Your data will be submitted automatically to HabitatMap. Proceed with your data collection plan. The "Connection Indicator" light should be blue. When recording in "Mobile active" mode (on a walk, for example), the AirBeam is connected to the AirCasting app via Bluetooth and must stay within 10–20 feet of the AirBeam to maintain the Bluetooth connection.

STEP 6: Click "View Data" to be directed to HabitatMap's website to see all data submissions.

NOW WHAT?

Your data is now part of the crowdsourced HabitatMap, an open-source digital platform, which can be viewed, shared, and exported. People have used this project to satisfy their curiosity about air quality, make behavioral changes (e.g., adjust your commute methods/route), and even mobilize local policy changes.

TAKE ACTION!

Does your data indicate the air quality in your neighborhood needs to be improved? Check out aircastingactions.org to find out how to take action as an individual or part of a nonprofit organization, or where educators can find classroom curriculum to bring awareness and changes to poor air quality in your community.

How to view your data

Visit **aircasting.habitatmap.org/mobile_map** Click on the appropriate type of session on the left side of the map: **Mobile** or **Fixed.** Use the filters below to find your particular data session.

Sensor field filters what particulate size data to display.

Parameters field lets you choose which AirBeam sensor data - humidity, particulate matter, or temperature - the map displays.

Location field helps you find your session. Enter a town, city, state, or zip code.

Profile Names and **Tags** fields used during a session will also help you locate your recorded data.

COMMUNITY CONNECTIONS

Are you a member of the Girl Scouts, 4-H, NASA Night Sky Network, or NSTA? Check out **SciStarter.org/library-partners** to learn about how this project connects back to your organization.

Check that all items have been placed back into the kit before you return it to the library.

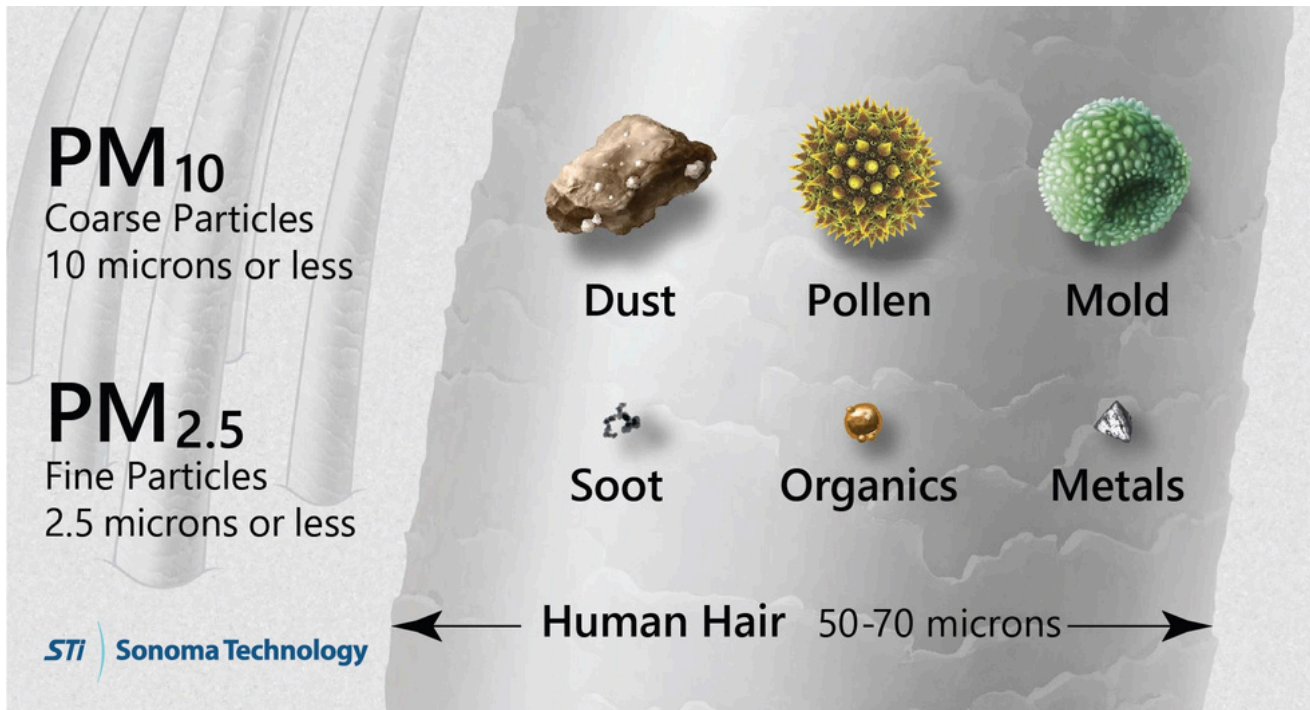**Thank you for participating in citizen science!**

ADDITIONAL RESOURCES

Air Quality 101 Fact Sheet
cfpl.info/airqualityfacts

Particle size reference

PM₁₀
Coarse Particles
10 microns or less

PM₂.₅
Fine Particles
2.5 microns or less

STi | Sonoma Technology

Dust   Pollen   Mold

Soot   Organics   Metals

← Human Hair   50-70 microns →

QUESTIONS?

Email us: info@scistarter.org

Citizen Science Kit: Monitoring Air Quality
Contents

REQUIRES FREE APP DOWNLOAD

A AirBeam3 air quality meter **B** Charging cable

Total Replacement Cost: **$285**

ASU School for the Future of Innovation in Society
Arizona State University

Concord
FREE PUBLIC LIBRARY

scistarter
Science we can do together.