BackpAQ App for Android and Apple (iOS)

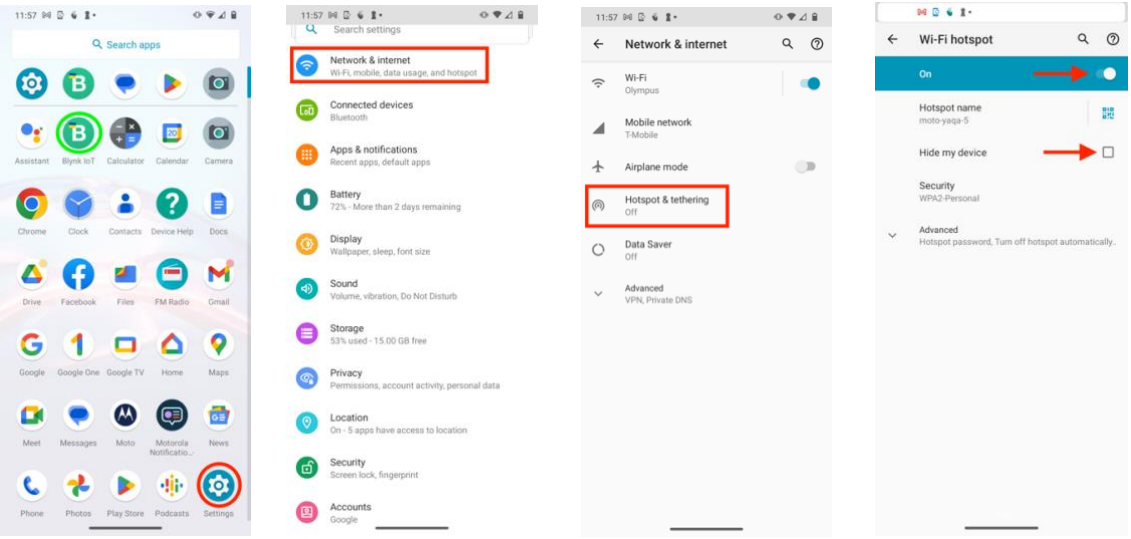
Quick Guide

Welcome to the **BackpAQ Quick Guide**. The intent of this document is to help you get started with the most often used functions and features of the smartphone-based BackpAQ app. Whether you are using the YAQA-supplied Android phones or a personal Apple phone, the capabilities are the same, and apart from some basic Settings differences, the screens should look nearly identical.

Smartphone Turn on and Settings

Let's go through the basic sequence to activate the phone's **WiFi Hotspot**, a feature you'll need to allow the BackpAQ to communicate with the Internet, and to enable the app to do the same.

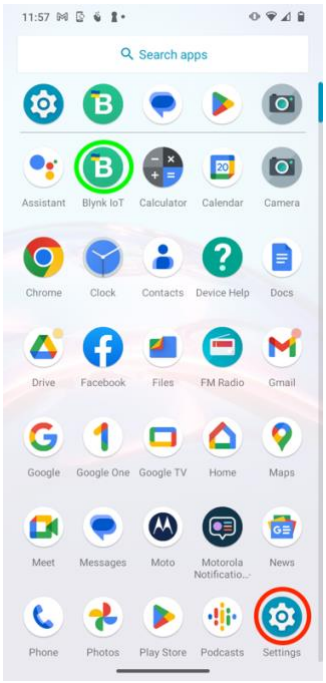
When you first power on the phone, you'll see a screen like the one on the left. Click on "**Settings**" (in the red circle) to bring up the Setings menu. Next, click on **"Network and Internet**". You will see the "**Hotspot & Tethering**" option…click here to bring up the Hotspot. Next you'll see the **WiFi Hotspot** screen (far right), where you will need to check the "ON" button and ensure that the "**Hide my device**" button is **NOT** checked.



Congrats, your phone is now ready to communicate with the Internet and with the BackpAQ sensor. Now, let's bring up the BackpAQ app, which is powered by another app called Blynk.

Starting the BackpAQ app

Now that the phone is set up to communicate with the Internet, we can start up the BackpAQ app which is powered by and utilizes the Blynk app. To do this, scroll your phone back to the home page like the one below left. This time, clock on the icon that's encircled in green, "**Blynk IoT**". This will bring up the Blynk/BackpAQ app (middle), showing all of the BackpAQ sensors in use by the YAQA program in ESUHSD. Next, locate the BackpAQ(s) you are using by scrolling through until the name (for example, "YAQA5") appears. Then, simply click on the small window to bring up the BackpAQ live data screen (far right). Here, we see the "YAQA-5" BackpAQ main screen.



Ok, now that we've got the BackpAQ app up and running, make sure the BackpAQ sensor is also switched ON. You should start to see live data appear on the various dials, gauges and text blocks. In the next section we'll dive into the most-used functions of the BackpAQ app.

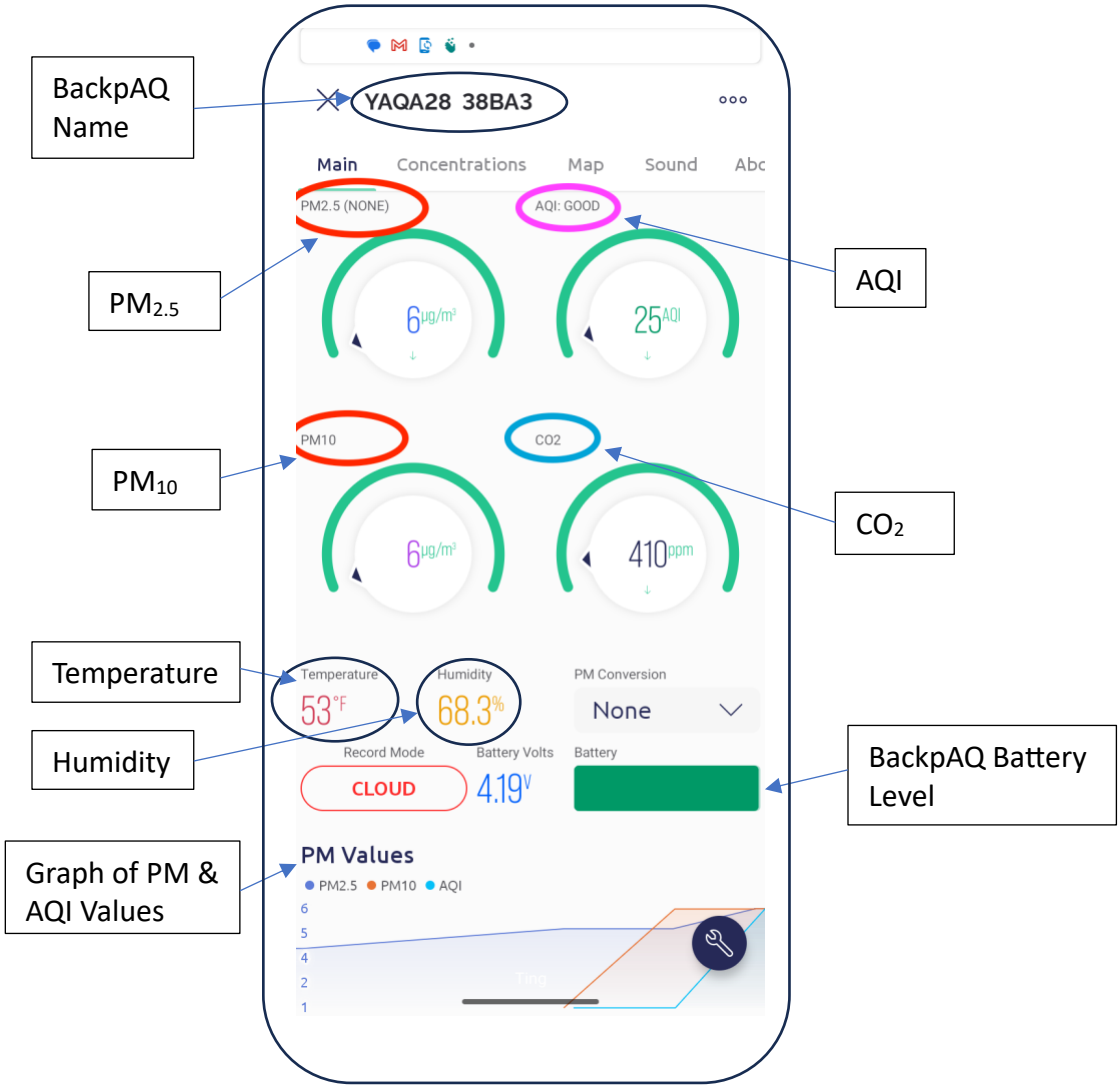
Using the BackpAQ app

In this section we'll do a quick tour through the most-used features and functions of the BackpAQ app. The tour begins at the BackpAQ main screen.

Main Screen

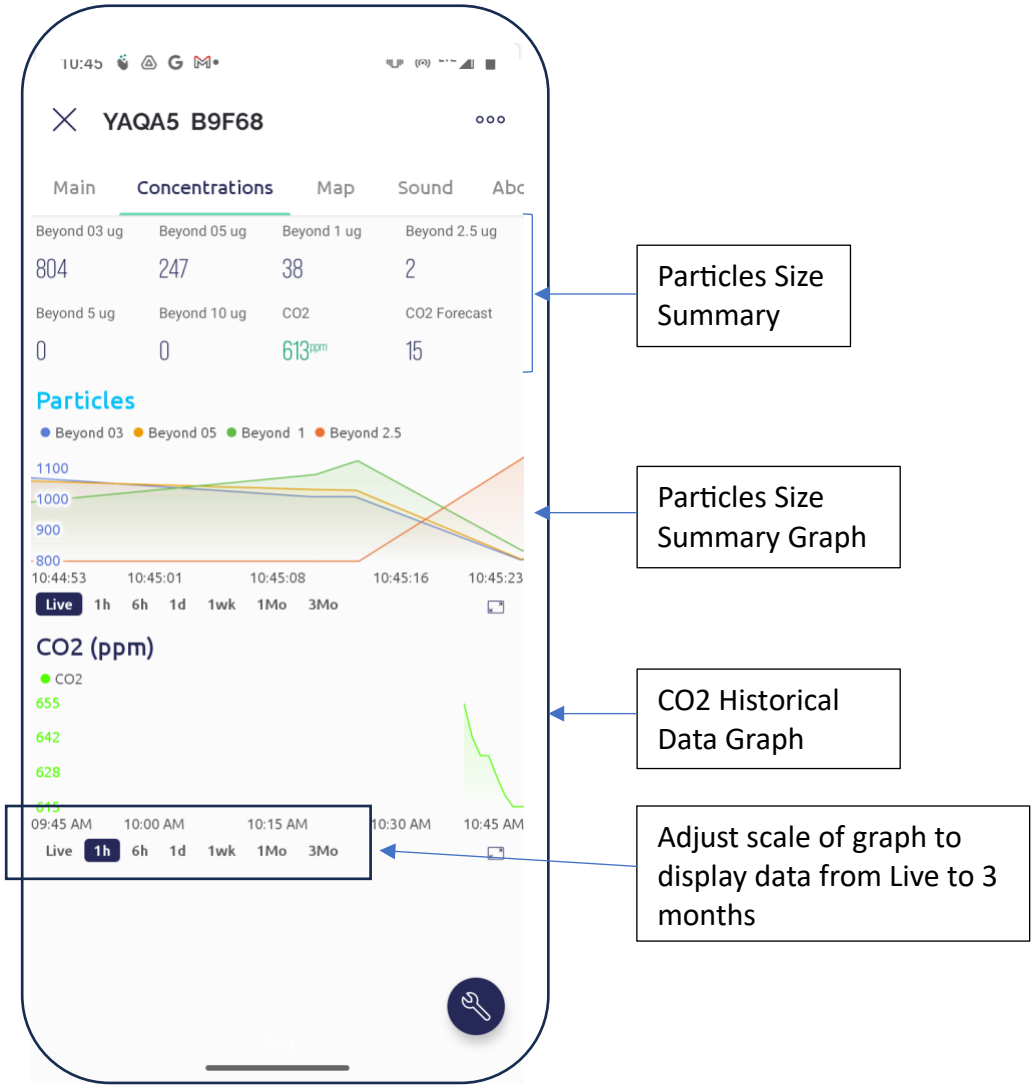
There are 4 main air quality measurements at the top of the main screen:

- **$PM_{2.5.\ ug/m3}$**. These particles come from many different sources, including automobile exhaust, fireplaces/wood-burning stoves, industry, and wildfires. They are so small they can be inhaled and enter your bloodstream, affecting your lungs and your heart.
- **$PM_{10\ \ ug/m3}$**. Particles with a diameter of 10 microns or less (PM10) are inhalable into the lungs and can induce adverse health effects.
- **AQI** The Air Quality Index is the USEPA's index for reporting air quality. AQI is divided into six categories, with each color corresponding to a different level of health concern.
- **$CO_{2\ ppm}$** CO_2 is the primary greenhouse gas emitted through human activities. In 2021, CO_2 accounted for 79% of all U.S. greenhouse gas emissions from human activities.



Concentrations Screen

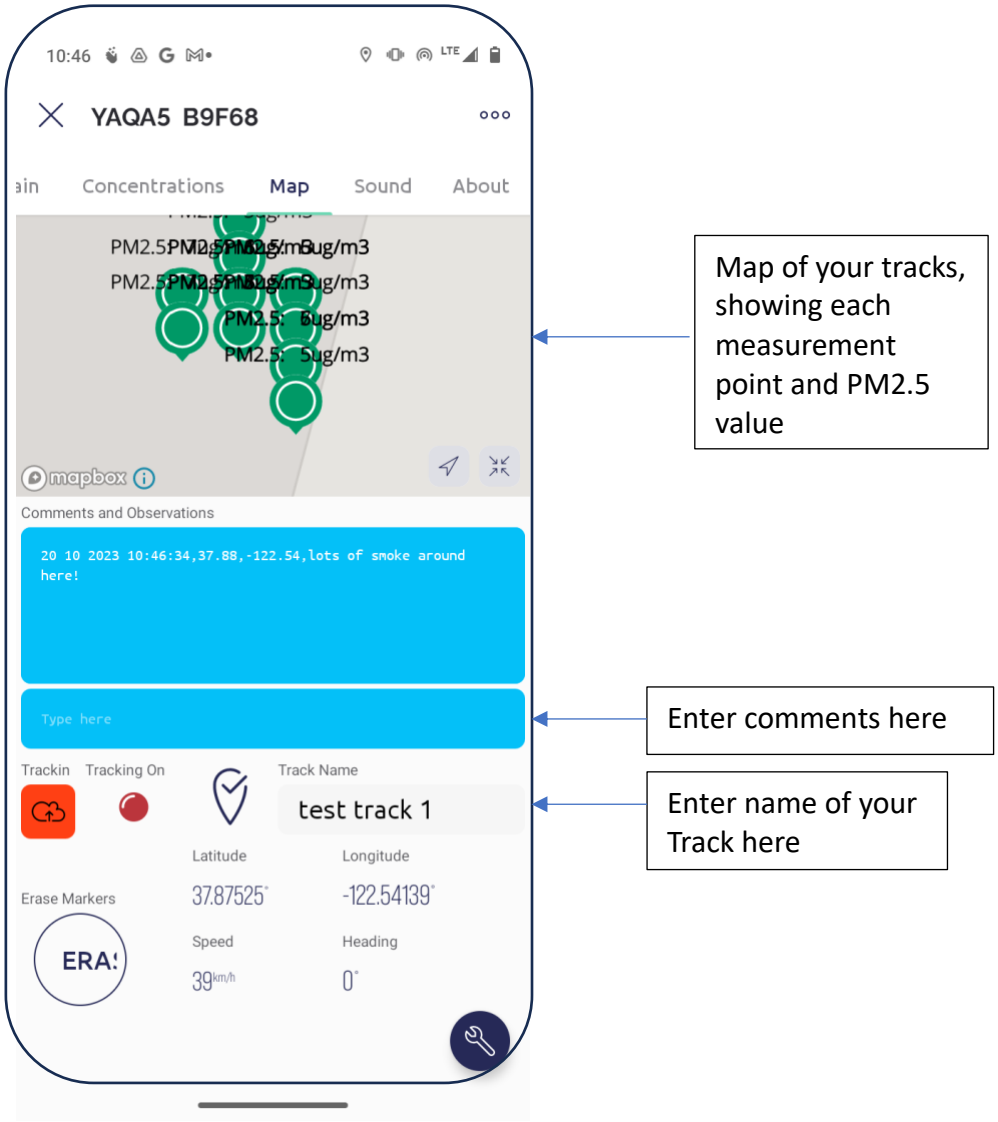
The second screen – Concentrations – deals mainly with detailed graphs that let you dive deeper into the sensor data. There is a summary of estimated particle sizes, an historical size summary graph, and an historial graph of CO2 measurements.



Map Screen

The Map screen allows you to actually "see" where you have been on your most recent air quality measurement journey. There is a map that shows the position – derived from the GPS that's in each BackpAQ device – of each sensor measurement. That is, where BackpAQ has measured PM2.5 and CO2 (along with temperature and humidity) about every minute along your walk around. All of these measurements – and GPS positions – are then stored in a "Track" which can be viewed in AQView once you are back in the classroom.

Additional functions include the ability to record comments along the way, which are "pinned" to the closest GPS position. You might want to remember a place where you saw something that could turn out to be a pollution source or other prominent feature. Later, in AQView, you can review these comments and see if your observations line up with what the data shows.



Additional Information about particulate pollution

What is Particulate Matter?

Airborne particulate matter (PM) is not a single pollutant, but rather is a mixture of many chemical species. It is a complex mixture of solids and aerosols composed of small droplets of liquid, dry solid fragments, and solid cores with liquid coatings. Particles vary widely in size, shape and chemical composition, and may contain inorganic ions, metallic compounds, elemental carbon, organic compounds, and compounds from the earth's crust. Particles are defined by their diameter for air quality regulatory purposes. Those with a diameter of 10 microns or less (PM10) are inhalable into the lungs and can induce adverse health effects. Fine particulate matter is defined as particles that are 2.5 microns or less in diameter (PM2.5). Therefore, PM2.5 comprises a portion of PM10.

What is the Difference Between PM10 and PM2.5?

PM10 and PM2.5 often derive from different emissions sources, and also have different chemical compositions. Emissions from combustion of gasoline, oil, diesel fuel or wood produce much of the PM2.5 pollution found in outdoor air, as well as a significant proportion of PM10. PM10 also includes dust from construction sites, landfills and agriculture, wildfires and brush/waste burning, industrial sources, wind-blown dust from open lands, pollen and fragments of bacteria.

PM may be either directly emitted from sources (primary particles) or formed in the atmosphere through chemical reactions of gases (secondary particles) such as sulfur dioxide (SO_2), nitrogen oxides (NO_x), and certain organic compounds. These organic compounds can be emitted by both natural sources, such as trees and vegetation, as well as from man-made (anthropogenic) sources, such as industrial processes and motor vehicle exhaust. The relative sizes of PM10 and PM2.5 particles are compared in the figure below.