Drone
CO2

Volcanic Vistas

Grades: 4 & Up
Time: 15 Minutes
Subject: Earth Science, Technology, Drones
Topics: Volcanic Gases, Volcanic Activity, Seismic Activity, Volcanologist, CO2

You and your partner, trained volcanologists and drone pilots, have been hired by the leadership of a remote village on the Indonesian island of Sumatra to investigate and identify a source of possible volcanic activity. Indonesia boasts the largest number of active volcanoes in the world and there have been many fatalities from surprise eruptions. Your mission is to provide the village leadership with solid data to help them determine if there truly is a new, active volcano and where it is located.

Recent seismic activity shaking the village has given the leadership concern that a new volcano may be waking up and will threaten their families, homes, and businesses. You and your partner will use a drone carrying a CO2 sensor that can detect volcanic gases, a tell tale sign of volcanic activity, to identify the volcano.

What are Volcanic Gases?

Volcanic gases are gases associated with volcanic activity and include water vapor, CO2, sulfur dioxide, hydrogen sulfide, and hydrogen halides. Magma contains these gases in dissolved form and as it rises to the surface and pressure decreases these gases are released and find their way to the surface through volcanic vents, fumaroles, the soil and other pathways to the atmosphere.

What You Will Need/Prep

- databot™ 2.0 & Vizeey™
- IOS/Android Smart Device
- Drone (Tello or larger)
- A method to top mount databot™ on the drone.
- Read the Vizeey™ Fast Start Guide and install Vizeey™ if you haven't already.
- Use Vizeey™ to scan this QR code and get started.
- Baking Soda
- Vinegar
- 5 Large Paper Bags
- One gallon jar to mix your chemicals

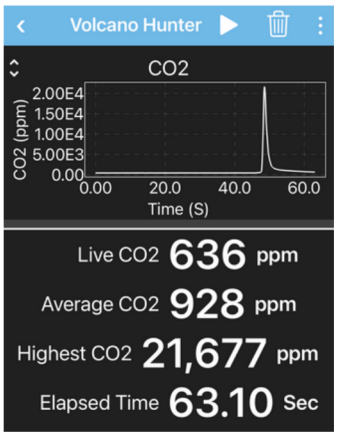
For Tello Users, download the free 3D printable mount for databot™. Download the zip file here.

PDQ: Stalking the Secret Volcano

Facilitator: Set up a volcano playing field with five paper bag "volcanoes" for student teams to test. Place a book or other weight in the four dormant volcanoes and a gallon sized jar with 1c, vinegar in the active one. Allow students to conduct trial runs, then, for the final run, without the students seeing which volcano is active, you will add 1/4c baking soda to generate CO2.

Students: Do this activity as a team of two. One teammate will be the data scientist, watching and capturing CO2 gas levels for each potential volcanic site. The other teammate, the pilot is responsible for flying with precision as quickly as possible to visit each site, get close enough to gather data, and move quickly on to the next location.

1. Carefully mount your databot™ on your drone using 3D printable mounts or adhesive.
2. Tap on **"Volcano Hunter"** in Vizeey™ to load the experiment. Use the ▶⏸ icons to start and pause the experiment. Clear your data before each measurement run.
3. **Practice:** Pilot: fly the course practicing controlled stops at each potential site and hovering long enough for data to be collected. Data Scientist: during the practice run monitor CO2 levels closely to develop a normal CO2 baseline level. You will be looking for any anomalous CO2 levels in your final run so pay close attention to "normal" levels.
4. **The Run:** Your facilitator will trigger the "volcano" and tell you to begin your team run. Run the course in the shortest time possible and identify the waking volcano.
5. Present your final data including your identified volcano and total run time.



Use the Volcano Hunter experiment to record your data and identify the active volcano!