Alternative methods to measure CO_2 concentration.

Below are some cost effective methods to measure CO_2 concentration for your cube. Note that most, if not all of these methods, involve a setup with an Arduino. Note that none of these have a direct way of connecting to your cube.

Pre-build Sensor

The low-cost pre-built sensors are the fastest way to measure CO_2 concentration. The main con is their accuracy and inability to measure concentration in real time every second. If you do not want to go the route via an Arduino, this is your best option. Below are some examples that can be bought on Amazon.

- CO2 Meter Air Quality Monitor Handheld CO2 Monitor 0~9999ppm Measurement Carbon Dioxide Temperature Humidity Detector NDIR Sensor Indoor Outdoor Air Quality Tester: Amazon.com: Industrial & Scientific
- Air Quality Monitor Indoor Home Air Quality Tester Analyzer CO2 Meter Portable Carbon Dioxide Formaldehyde Detector Testing Kit with Digital Temperature Humidity Sensor HCHO TVOC Test for Car Outdoor: Amazon.com: Industrial & Scientific

CO_2 NDIR Sensor

NDIR Sensors are commonly found in CO_2 meters to measure concentrations. Specific sensors can be connected via an Arduino (Gravity: PWM Non-dispersive Infrared Carbon Dioxide Sensor (400-5000 ppm) - DFRobot). Below are some examples of guides on how to build one.

- Arduino | Adafruit SCD-30 - NDIR CO2 Temperature and Humidity Sensor | Adafruit Learning System
- How to Design and Construct Indoor Air Quality Monitoring System - DFRobot

MQ-135 Sensor

The most cost effective method to measure CO_2 concentration is via an Arduino MQ135 sensor. The sensors themselves are very cost effective and readily available on Amazon. Arduinos and other materials can also be readily found. There are many guides and sources on how to build and code one. Below are some examples:

- Arduino MQ135 Sensor Based CO2 Meter - Measure CO2 using Arduino (circuitdigest.com)
- MQ-135 Sensor (CO2, Benzyne) with Arduino | Sheekar Banerjee - Hackster.io

Again the above are only a few of the plethora of options to measure CO_2 concentration. We encourage teams to research and find the best option that suits your needs.