# Air Quality Project Overview Sheet

For this **engineering research project**, you will define and conduct your own air quality research project. The research question/hypothesis are your choice, and you will be responsible for organizing the required tasks and keeping the project on schedule.

## Project Steps
1. Brainstorm ideas, select your topic and define your research question or hypothesis.
2. Plan the project, including procedures and timeline.
3. Collect data.*
4. Organize, analyze and interpret your data.
5. Make a poster to present and communicate your research.

* Use the Pods (or a different type of air quality monitor, as available) to collect your own data, or use existing downloaded data that you have found (see source suggestions below).

## If you choose to use the Pods…
- You can measure $CO_2$, CO, PM and VOCs.
- You can measure temperature, humidity, pressure and record GPS location data.
- You can use the monitors indoors or outdoors.
- You can plug them in or run them off batteries. *Note that sometimes not all of the sensors receive enough power when running off the battery.*

## If you wish to use existing data…
- Find air quality data from across the state on the *Colorado Department of Public Health and the Environment* website at http://www.colorado.gov/airquality/.
  - Project example: Use the data to compare ozone levels in urban vs. rural areas of Colorado.

- Find global air quality data at http://openaq.org.
  - Project example: Use the data to compare particulate matter data from cities in China to levels in U.S. cities (like Delta, CO).

- For Colorado oil and gas data, such as well data, production amounts, public complaints, etc., see the AirWaterGas Data Portal at http://data.airwatergas.org.
  - Project example: Use this data to determine the number of wells in an area or average production levels, and compare this to average air pollutant levels.

- All of NASA's data is also publically available. Ask your teacher or university student mentor if you are interested in a particular data set.

## Example Project Ideas
Below are some example projects that other student groups have taken on in the past. You are welcome to repeat an idea (you may even want to compare your data to past data) OR choose an entirely new idea. See examples of previous AQ-IQ projects at www.colorado.edu/aqiq/.

Indoor air quality:
- Compare data from different classrooms.

➢ Compare data from different schools.
➢ Compare data in homes that use different stove types (for example, coal vs. wood).
➢ Compare data in homes in different parts of town (for example, near/far from a highway).

Outdoor/ambient air quality:
➢ Examine air quality in a parking lot throughout the day.
➢ Examine outdoor air quality at different locations in a community.
➢ Look at how air quality changes with elevation and/or season.

Targeted testing:
➢ Compare different vehicle emissions.
➢ Compare the abilities of different types of plants to act as a $CO_2$ sinks.
➢ Measure methane levels near ranching operations.

## Important Advice & Tips

- While they are simple to operate, the Pods are not perfect and you will want to **check your data frequently**, and you will want to **leave enough time to collect a second data set** if needed. (The pods can malfunction, resulting in data loss, so be sure to follow the procedure and check the lights to make sure the Pod is running correctly.)

- Remember, new information may lead to new ideas, so it is okay if your hypothesis or research question evolves throughout the project.

- You will also need to **coordinate with other groups** that want like to use the air quality monitors. Creating a class schedule may be helpful.