Climate/Air Quality Lab

Task

Your task is to work with your groups to design and write up a monitoring guide that communities can use to collect data to examine a particular issue. The issues can include, but are not limited to, the following:

- The impact of distance to pollution sources;
    - See the Blue Sky Zero Notebook for some potential inspiration
- Diurnal or temporal patterns in pollution emissions;
- Urban heat island effect;
- Tree cover or other aspects of "green" or "gray" infrastructure and impacts on pollution;
- The impact of vehicle idling on emissions.

You will work collaboratively as a group to write up a monitoring guide that incorporates existing science, your own findings, and your recommendation for future monitoring efforts. In your report, you will briefly synthesize background information (e.g. at least 3-5 scientific peer-reviewed articles) pertinent to your topic and ideally to Southern California. You will then include results from your own group exploration of the topic using your PL Air unit. Finally, you will offer your interpretation of your data and a protocol or plan for future monitoring efforts building on your project.

My grades will be based on the group report that you ultimately submit. To that end, one helpful adage is that "the perfect is the enemy of the good." Focus on something feasible and interesting rather than something that is intractable but super cutting-edge. I have designed this project to explicitly incorporate group work because that is how real-world environmental science is performed: in collaborative teams of individuals working together to collect and analyze data for a common goal. Finally, your report should be word-processed and checked for spelling and grammar.

Timeline

- Week 2 (9/8): Performing a preliminary transect and designing group project
- Week 3 (9/15): Continuing to collect data and lab focused on troubleshooting data analysis

    - Library tour → how can one efficiently use library and Internet search tools?
    - Co-developing peer review and rubric guidelines
    - Time permitting, peer review - if not, will happen in week 4.
    - Time permitting, interpreting scientific articles. If not, will happen in week 4.
- Week 4 (9/22): Continuing to collect data if needed; lab assistance for data analysis as needed
    - Reports due
    - Can extend deadline to 9/28 -- but take note of exam timing (10/1)

Recommended report structure

- Introduction: What is the relevant background for the question you are seeking to address? What is the local context that is relevant?
- Methods: How did you collect your data? How did you analyze it?
- Results: What did you find? How would you interpret your results in light of the background literature and the course materials?
- Future recommendations/Monitoring protocol: What methods would you recommend local communities follow using PL Air units to monitor their local environments for the issue you explored? What might you recommend changing or experimenting with?
- Author contributions: Please explicitly make note of how you all contributed to the report. One example could be:
    - "QB, KD, and CC identified the research topic and co-developed the design. QB and KD led the introduction drafting and background literature search. CC and QB performed the statistical analysis. All of the authors contributed to the interpretation of the results and the recommendations for future monitoring schemes."

Assessment

NB: Lab report does not have to be very long - 1500 - 2500 words should be sufficient! (If it is shorter, that is fine too.)

- Background and context (25%)
    - How well do you establish relevant background information on your topic?
    - Do you clearly convey its significance for the environment and/or humans?
    - How do you use the literature to contextualize your observations?

- Results communication (25%)
    - What have you found? What have you learned?
    - Do you describe your data clearly and accurately?
- Developing a community monitoring scheme (25%)
    - Do you develop a sensible monitoring plan?
    - What aspects of the literature and course materials (if appropriate) inform the monitoring scheme that you have initially tested out?
    - How do your results inform future monitoring schemes?
- Writing style (25%)
    - Can I understand what you sought to do and what you found?
    - Can I understand your interpretation of your findings and the implications for your proposed monitoring scheme?
    - Is your communication clear?

Resources for scientific writing

The following resources may be helpful in illuminating some best practices for writing in a STEM context. Good scientific writing is not dry nor dense. Instead, it is precise but accessible, sufficiently nuanced but clear.

- The Science of Scientific Writing by George Gopen and Judy Swan
- Resource on scientific writing from Bates College Biology Department
- Resource on scientific writing from the Rosalind Franklin STEM ambassadors

Submission

Please have **one member of your group** submit your lab report at the Sakai assignment (**due 9/24 at midnight** - equivalently, 9/25 at 12:00am, but I am willing to extend the deadline if necessary). You can either download and submit your lab report **as a .docx file** (in the "Attachment" field) or you can share the **sharing link to your Google document** in the inline "Assignment Text" box.

Additionally, please share your assessment of your team effectiveness with Prof. Chang here at this Gradescope assignment. Everyone should do the Gradescope assignment individually.

Troubleshooting PocketLab Air data collection

Problem: My PocketLab Air won't turn on

- When you plug in the unit, if it is on, you will see it flash green and red, then intermittently red from the diode on top.
- If it has been a long time (>3 days) since you've charged the unit, you may need to turn it OFF when charging.
- First, plug in the unit so that it has some juice (1 minute or so should be fine).
- Second, unplug the unit and long hold the power button on top until you see it flash solid red for 2-3 seconds.
- Third, release the power button when it has flashed solid red for 2-3 seconds. The unit is now powered off.
- Fourth, plug the powered off unit back in to the USB micro cable and let it charge for 2 hours or so.

Question: How do I collect data from the PocketLab Air using Google Chrome on my laptop?

- Log in to https://app.thepocketlab.com/
- Use class code: "NFAOMZ"
- Make sure you record data in a notebook I assigned, such as "Lab Report Data Collection Placeholder".
- Make sure that you SAVE ("Save ^" button) and EXPORT ("Download .csv" option or "Google Drive" option) your recorded data each time you make a recording.
- Note: As I stated in the class announcement on 9/16, you **do not need to use this notebook** but if you wanted to collect data using Google Chrome on a laptop, I hope this notebook option is a safer choice.
- Do make sure you consistently and continually download and save your data though and upload it to somewhere like Google Drive.
- **If you have or plan to collect your PL Air data via phone, disregard this PocketLab Notebook information - this is only for people collecting data using Google Chrome on a laptop.**

Question: How do I use PocketLab Notebook again on my phone or computer to record data from the device?

- Log in to app.thepocketlab.com
- You can look at the instructions for the past assignments:
    - Start using PocketLab Notebook (introduction to the online software)
    - Getting to know the PocketLab Air Units (my instructions on recording data from a device to a computer or a phone)
    - Week 2 - Climate/Air Quality Lab has some guidance on using the process we did in Week 2 to clean up iPhone-collected data.
        - If you have issues with cleaning up iPhone data, please let me know.

Co-developed peer review and rubric guidelines

Placeholder text
Be specific with your comments. What line/section/paragraph is unclear and why? What would be a way to go about fixing it?

Template for lab report

Feel free to disregard if you already have a working draft.

Introduction

- Introduction: What is the relevant background for the question you are seeking to address? What is the local context that is relevant?

Methods

- Methods: How did you collect your data? How did you analyze it?

Results

- Results: What did you find? How would you interpret your results in light of the background literature and the course materials?

Future monitoring protocol recommendations

- Future recommendations/Monitoring protocol: What methods would you recommend local communities follow using PL Air units to monitor their local environments for the issue you explored? What might you recommend changing or experimenting with?

Author contributions

- Author contributions: Please explicitly make note of how you all contributed to the report. One example could be: “QB, KD, and CC identified the research topic and co-developed the design. QB and KD led the introduction drafting and background literature search. CC and QB performed the statistical analysis. All of the authors contributed to the interpretation of the results and the recommendations for future monitoring schemes.”

References

(*an example*:) Beattie, B. R., & LaFrance, J. T. (2006). The law of demand versus diminishing marginal utility. *Review of Agricultural Economics*, **28**(2), 263–271.

FMI please see this resource from the University of Arizona. I generally recommend following the conventions of the American Psychological Association (helpful resource from Purdue University) for citations.