**Field work: Impact of Natural & Human activities on air quality**

**Introduction**

*Objective*

In this experiment you will test the quality of air by measuring the number of particles from different locations.

*Testable Question*

How does the testing location (indoors or outdoors) affect the amount of particulate matter collected on the index card samples?

*Design strategy*

Discuss first within your group, and then between all the groups in the class, the location where you will place your samplers (all three samplers, or collectors, you will make will be installed at the same location).  
Define as a class your overall goal for this investigation:

* Perhaps you decide to look for the most polluted place in UC Merced;
* Perhaps you decide to look for the least polluted place in UC Merced;
* Perhaps you want to look for another specific pollution pattern at UC Merced (elaborate which one)
* …

Be sure that each group will study one specific location, presenting each of them different environmental conditions (indoor, outdoor, place close or away from emissions …).

A picture containing person

Description automatically generated*Materials*

* Vaseline
* Three index cards (4x6) with a hole punched  
  in a corner
* Three strings
* Three glass slides
* Permanent marker
* Heavy-duty tape
* A penny

**Procedure (~30 min)**

1. Carefully remove the glass slide from the Sample 1 index card. Hold the slide by the edges, making sure not to touch the sample area, and place it under the microscope.
2. Using the stereoscopic microscope, count the number of particles in the sample size found inside the circle you drew, covered with petroleum jelly. A particle is any speck on the slide. It may be dust, pollen, or some other type of matter.
3. Record the number of particles you counted in the data table below. Make sure your location is labeled in the corresponding row of the table.
4. Repeat steps 1-3 for the remaining two samples collected by your group.
5. Compute the average number of particles collected from your samples.
6. After computing the average and standard deviation at your workstation, and if you have time, move to another workstation to record and verify the data of at least one sample at that workstation.
7. Report all your results on the table drawn by your TA on the whiteboard of the class.
8. After completing your data table for all the class, report the particle concentrations on the UC Merced map (last page). Simply copy the circular symbols and paste them on the map so each study site is presented with its corresponding concentration. *Check with your TA if an adjustment of the concentration scale is needed.*

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| --- | --- | --- | --- | --- |
| Study site & description | Number of particles collected | | | |
| sample 1 | sample 2 | blank | Average |
| *Little Pond: significant wind exposure, mostly under sun, far from traffic, lots of vegetation* | *55* | *71* | *2* | *63* |
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**Data table**

On next page, you will find the map of UC Merced on which you can report the average concentrations of particles at every sites using the circular symbol and the labeled color coding.

***Turn in:*** Based on these data, answer the following questions in complete sentences:

1. What are the similarities in your findings? What are the differences in your findings?
2. Did you blank samples show very low concentration of particles? Did you expect that observation? Why?
3. How can the placement of the samples on the study site affect the results?
4. Which location had the most particulate matter after a week of collection? Are your results confirming your expectations?
5. Overall, did indoor air have more or less particulate matter than outdoor air?
6. Describe the environmental conditions at each location (wind exposure, nearby roads, nearby fauna/flora/human activities…). Can you deduce a relationship between these conditions and the amount of air particles?
7. Propose reasonable and possible ideas for ways to reduce the particulate matter in and around the university.
8. What conclusions can you finally draw from your data?