Physics 524 Week 7 Homework Exercises (Revised)

Due: Tuesday 10/10/2023 at 10am

Due date reminder, etc.

Please email your completed assignment to the course TA by Tuesday, 10 am of next week. Assignments that are late by at most one week will receive at most 50% of full credit. We will not grade anything submitted more than one week late.

Your homework submissions—code, cell phone photos, etc. must include enough identifying information for us to tell who you are!

1. ***Mask***
   Different masks have different filtering efficiency for various substances. Most surgical and N95 masks, for example, will stop droplets but not VOC vapors. Using a mask available to you and your atmospheric sensors, test the ability of the mask to filter these substances. If you have a particulate sensor, you can use this as well (relevant for smoke from wildfires and other environmental pollutants. Recommended measurements:
   - Humidity and VOC from your breath, unmasked. Find a good distance where the sensor picks up a signal.
   - Humidity and VOC from your breath, masked.
   - Use a plastic cup, duct tape, etc. to make a closed volume of air with the sensor in it. Make sure it's as airtight as you can make it. Now, you can use a pump or fan to further test the filtering efficiency.

   Full credit will be awarded for:
   - A short (1-2 paragraph) writeup of experimental design and procedure
   - At least 1 baseline measurement and 1 filter data measurement
   - Some simple data analysis (comparison plot)

   Creativity is encouraged. If you need additional materials, ask course staff.

2. ***Tinkercad***
   Design your own cute little box, with a lid that slides into place instead of just sitting on top of the box. Make the box large enough to hold a few SD cards. When you're finished with your design, email George both the STL file and the gcode file. George will print them for you.