TGIF
Validation

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Abstract:

The purpose of this document is to test our equipment and see how the temperature affects the air pressure. We came to the conclusion that as the temperature decreases the air pressure increases.

Purpose of Validation

Our experiment will be using a DAQ, a barometer, and a temperature probe in order to determine how the temperature affects the air pressure. We will need to validate our equipment to make sure that it will work properly when we are out in the field.

Equipment to be Tested:

- Vernier Barometer
- Vernier Temperature Probe.

Research:

- Sensing element: SenSym SDX15A4
- Pressure range (as shipped): 0.8 to 1.05 atm (25 to 31.5 inches of mercury)
- Maximum pressure that the sensor can 30 psi or 61 in. of Hg
- tolerate without permanent damage:
- Sensitivity: 436 mV/in. of Hg to 13.06 V/atm.
- Resolution
- 13-bit (SensorDAQ): 0.0015 in. of Hg
- 12-bit (LabQuest, LabPro, Go! Link, 0.003 in. of Hg
  ULI II, Serial Box):
- 10-bit, 5 volt A/D converter (CBL 2): 0.01 in. of Hg
- Combined linearity and hysteresis: typical ±0.1% full scale, maximum ±0.5% full scale
- Response time: 100 microseconds

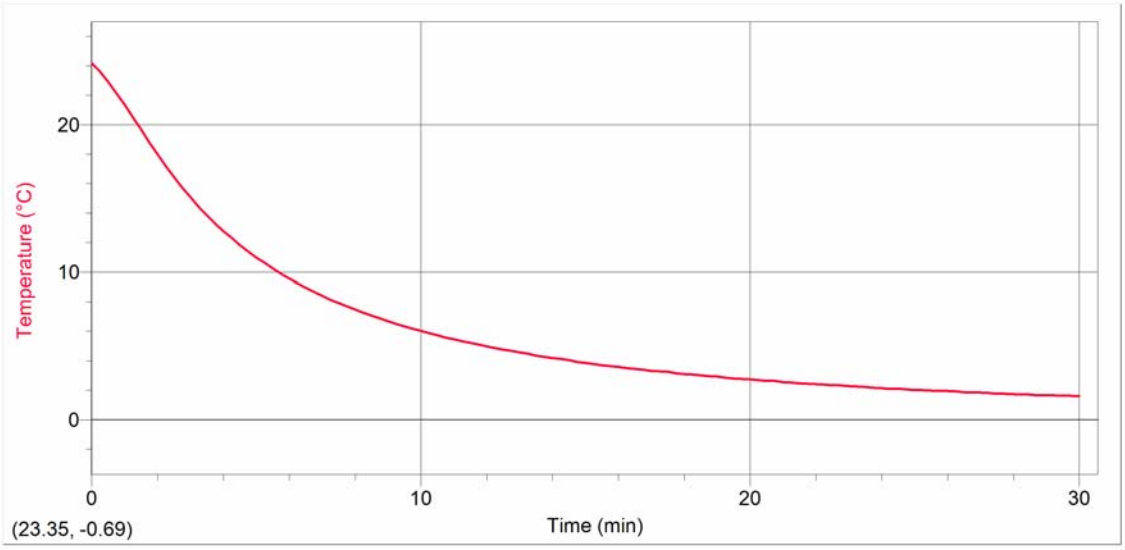
We expect that the pressure will vary from 96 kpa to 98 kpa due to regular weather patterns and it should decrease about 15 kpa as the balloon rises from ground level to 1000 ft elevation.
The temperature should vary from about 55- 75° F in the morning and should decrees by about 5°.

Test Plan:

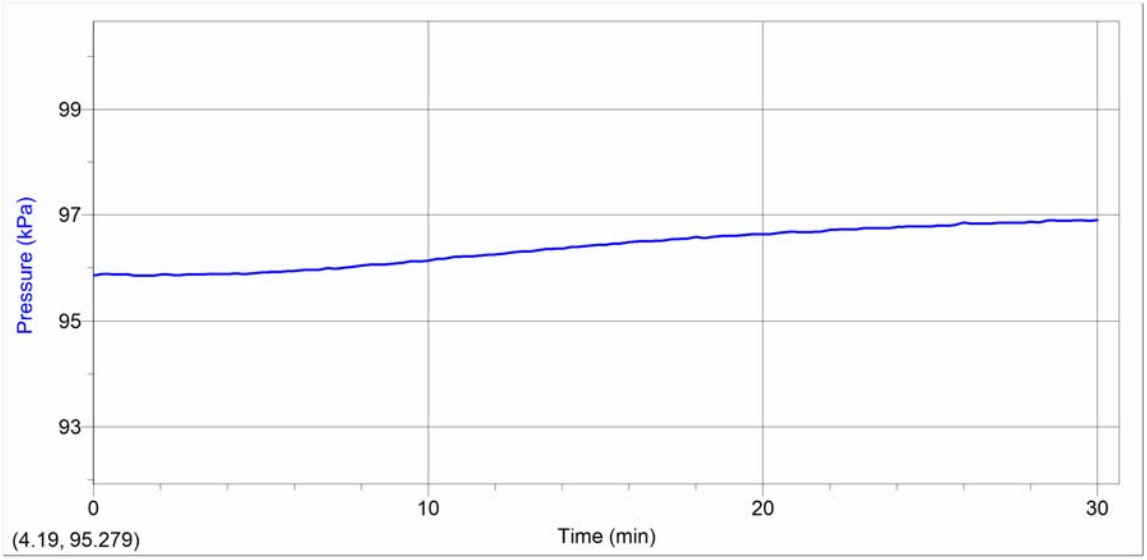
1. Take a cooler full of ice and stick a mason jar inside of it for the temperature probe and barometer to sit in
2. attach the DAQ to the computer and turn it on.
3. attach the barometer and temperature probe to the DAQ

4. After everything in connected attach DAQ stick the temperature probe and Barometer into the jar which is located in the ice.
5. once you place the equipment into the jar begin to collect data for a time span of 30 minutes with the computer recording data every 15 seconds
6. after the computer is completely done collecting data transfer data to graphs and analyze the data that was collected

Analysis: Temperature



Air Pressure



Conclusion ;

After testing our experiment in class we came to the conclusion that as the temperature decreased. Thee pressure inside of the jar increased. This is the complete opposite of what we thought would happen since when molecules get colder they slow down which in turn would cause the pressure to decrease. But what happened is as the speed of the molecules slowed down then the pressure inside of the jar increased.