

TGIF Design

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Abstract:

The purpose of this document is to explain in detail our experiment and equipment. It will also describe who will be using what.

PURPOSE:

-The purpose of our project is to test the how the temperature affects air pressure at a higher altitude. We are also going to compare our results to a ground station we will set up that is also taking the same data as the balloon is but at a different altitude.

REREARCH:

Intro- Most of our research came from past experiments from past years. We checked experiments from other teams to see what they gathered and what kind of equipment they used. We found out that temperature and altitude decrease as altitude increase. Our team wants to take it a step further we want to see how much it drops and what variations there is. We are also going to compare the results to a ground station.

Research- Air pressure is the force per unit exerted on a certain area. Air pressure is related to its density, which is directly related to the air's temperature and height above the Earth's surface. Pressure varies depending on the weather. Air pressure is measured by an air, mercury or water barometer. In our experiment we chose an air barometer. Temperature can be measure in three different ways (Celsius, Kelvin, and Fahrenheit).

METHOD:

-Our team will use 2 lab pros, 2 barometers and 2 temperature probes to gather all our data. We will set up a ground station to record data for the whole day. Other teams may use the data that we have gathered for their experiment also. We are also going to have a station set up in the balloon so we can see the changes of air pressure and temperature vs. the altitude. We will also compare the air station data to the ground station data to accurately see the changes with altitude. With the data we can see exactly the changes in temperature as altitude increases.

POSSIBLE PROBLEMS AND SOLUTIONS:

- Wind hitting the barometer- validation 1 below
- Failure with the DAQ such as it breaking- having a backup
- The batteries dying- taking extra batteries
- The ground station fails to record data- make sure DAQ works prior to balloon fest

INSTRUMENT CHARACTERISTICS

- Barometer: the barometer is the device that will record the pressure Data in the day of Balloon Fest.
- Temperature Probe: this device will tell us the temperature in the day of Balloon Fest

VALIDATION OF EQUIPEMENT:

1. Create something that will block the wind from hitting the barometer but keep it so the barometer gets accurate data. Then we will blow a fan on it and look for any spikes and irregularities in the data (this test will be done with both DAQs)
2. Test the temperature of the probe receives by changing the temperature around the probe and getting data. We will check for any flaws in the data (this test will be done with both DAQs)

EXPECTED RANGE OF MEASUREMENTS:

Pressure is From 95.5 to 98.5

Temperature From 65 degrees F to 80 degrees F

HYPOTHESIS:

The hypothesis of our team is that pressure will increase as temperature increases.

Test:

In the day of Balloon Fest were going to test it by putting the barometer and the temperature probe in the balloon and send it up about 800-1000 feet and live it there about 30 min. As the day goes the temperature will increase and then we can see the change of pressure as temperature increases.

PROCEDURE (ON DAY OF BALLOON FEST):

-We will test our hypothesis with a balloon test and a ground test. We will use the data and compare the results. We have to be very careful with the ground test for we get one chance to record data and we have no back up if it were to fail. As for the balloon station we will take more than one test, hopefully 3 depending on the amount of time that we are allowed. We will then compare the results and data of the balloon tests and determine if one or

more of the tests have a significant flaw. If so, we will look back on our journal that we will be taking through out the day and if there is a problem during the time of the flaw then we will go with the other data for that part of the experiment.