

Balloon Fest 2007

Airheads

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Plans before flight:

Purpose-

Our purpose is to make up an experiment that we can analyze and receive data from. We have to make sure that it can be done and that we have the appropriate equipment to do it. All of the equipment has to work to get data. We have to take into consideration things that might occur to think about.

Issues to consider-

- The altitude needs to be considered for accurate measurements.
- Pressure changes with height and is a big part of our project.
- Weather changes and we have to take note of it and look for the change in our data.
- We have to keep a look on shadows cast on to the balloon.
- Wind blowing into the barometer can change the pressure.
- We have to make sure that all of the equipment is securely attached to the gondola.

Hypothesis-

The ratio of shaving cream expansion would be the same as the ratio of difference in the pressure.

Design-

We had to come up with an experiment that would stand out and that would be different. So for our design we are going to measure pressure by the use of shaving cream and pressure in the air. Shaving cream expands with drop in air pressure so we measured how much times the original the shaving cream dropped. Then we took the ratio of difference that it was. Then we divided the pressure at the top of the flight from the pressure at the ground and they turned out to be nearly the same, as you will see later. To measure the shaving cream we will put marks on the side of the jar to see how much time the original marks it expands.

Procedure:

Balloon Setup-

First we have to attach the balloon to the helium bottle. Then we have to open the bottle open to a crack and slowly blow up the balloon. Then we have to secure the end of the balloon around a metal ring with tape by bending over the tip of the balloon and twisting it shut. Afterward we have to set up the gondola.

Setting up the gondola-

To set up the gondola we have to make sure that everything is secure to the inside. Then we have to attach the gondola to the balloon by cutting holes into each corner of the gondola and the putting ropes into though the holes. The rope is then put into the ring at the bottom of the balloon and then secured.

Preflight-

The first thing we will do is double check the settings and programming on the LabPro. Then we will place the test tube into the gondola making sure that it won't fall over. We will put shaving cream in the test tube, a tenth of the test tube. Then we will activate the lab pro and launch it.

Flight-

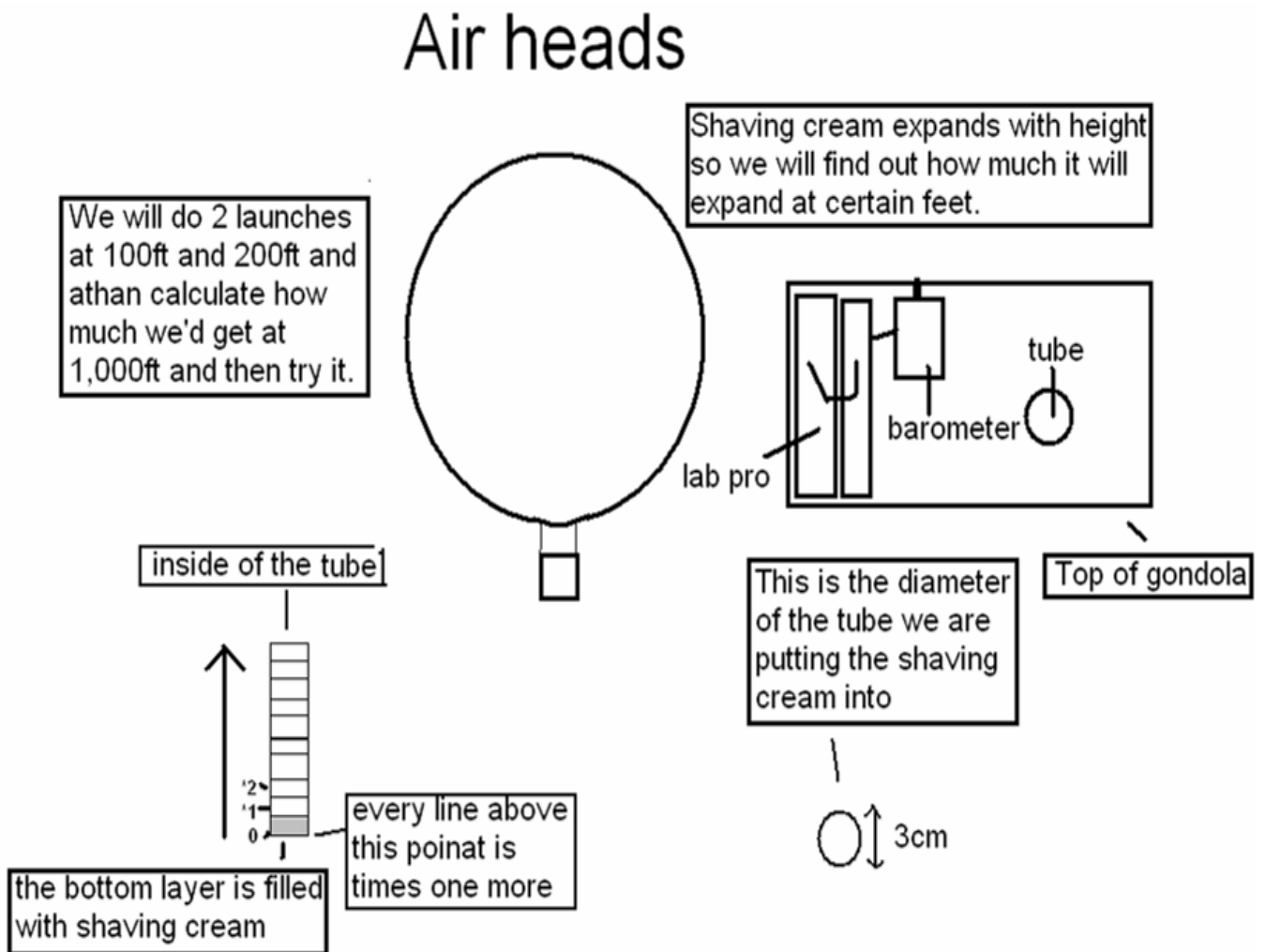
We will then send it up to 100 feet. Then we will send it to 500 feet to make a difference of 400feet. Then we will make an estimate of how high the shaving cream would rise at 1000ft. We will then test this hypothesis by sending it up to 1000ft and see how much the shaving cream rose. Within every single launch in this stage will take the data from the labpro.

Post flight-

We will take out the lab pro and all of the other things inside of the gondola, pop the balloon, and receive the data out of the LabPro. Then we will use the information to find out at what point the shaving cream was increasing in size. Then we would put the information we have received into a PowerPoint project.

Final design-

For our final design we decided to use a test tube not a glass jar because the shaving cream did not expand as much as we wanted it to. We also made changes to the lab pro because the settings were wrong. We also decided to use a cardboard box for less weight. These are the changes we made to our design. This design brought forth good data.

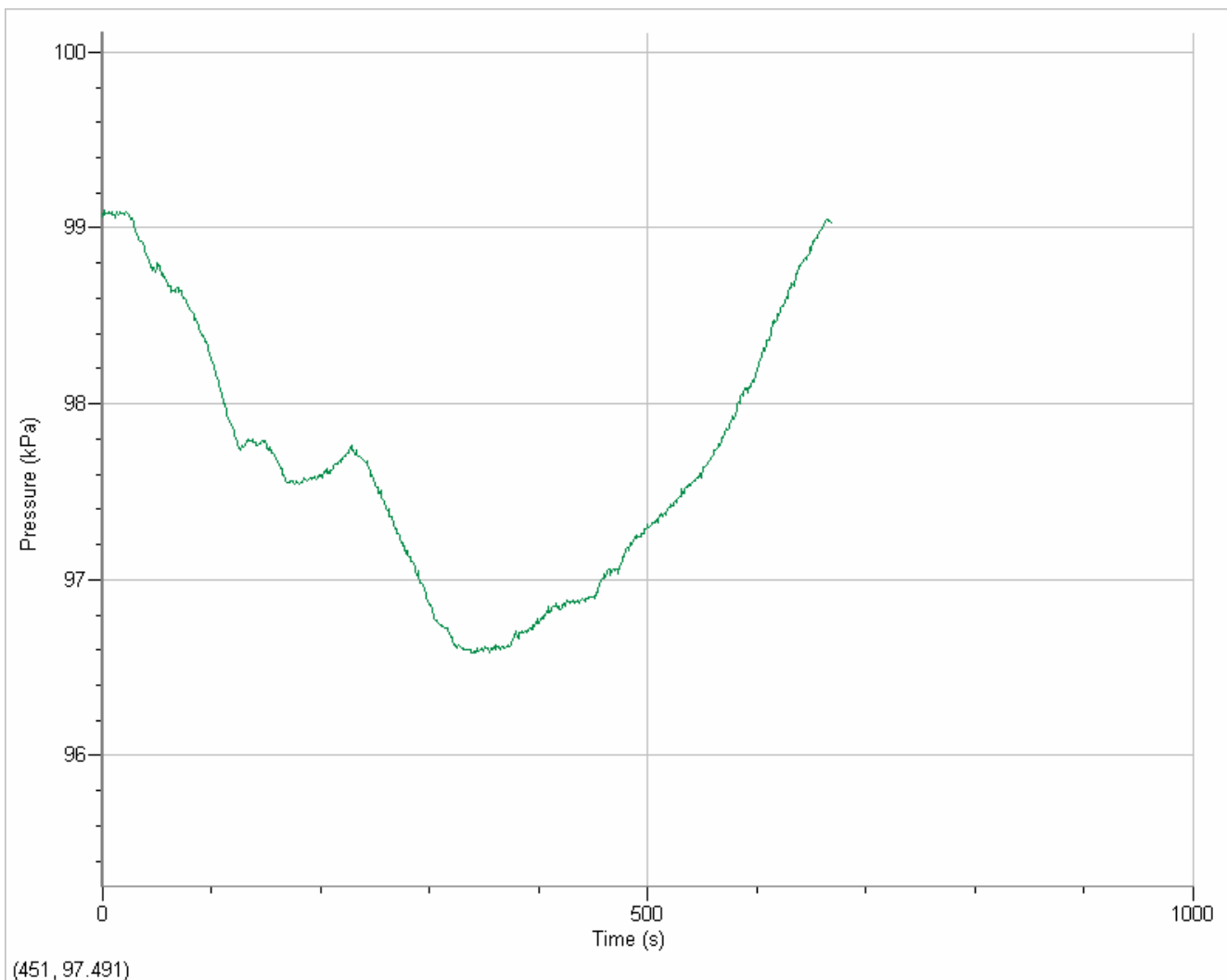


Data collection and analysis

During our experiment, we recorded events, time, and line length on a log. The line length and time correlated with events on the log. On our graph, it displays air pressure. Our results showed that air pressure decreases with altitude. Various stalls and hills on the graph resulted from such events as our balloon getting tangled with another balloon. We ended with a ratio of 1:1.03 for the pressure: the shaving cream and the pressure. Our lowest pressure was 96.6 and our highest was 99.1. Our shaving cream expanded 1.1 times its original size. This is a difference of .97.

$$\frac{99.1}{96.6} = \frac{1.03}{1}$$

Average ratio:1.065



Future Improvements to Be Made-

We had many instances during the experiment of thinking that it could have run much more smoothly if we had improved upon certain areas. One thing we can improve on next time is communication with our sharing groups; from the very beginning we had to improvise a line and wheel because both teams had thought the other was bringing the line. We also could improve upon our understanding of the labpro; we had run into several problems with the labpro such as collecting a different set of data, and the labpro losing launch data before being saved on the computer. Other problems resulted from our impatience, which would be another item of improvement; because we had launched the first few times in our experiment without making sure absolutely everything was perfect, we ended up with bad data for those first few trials, and wasted valuable time. Also about time is that we ran to the last of it finishing our experiment, and what we could work on next time is to practice a flow that would keep us from losing too much time before going out on the field. Last, we could make the experiment run much more smoothly if next time we prepare an alternate plan for anything that could go wrong up to what we can think of.

Conclusion-

In this experiment, the shaving cream did expand with lower pressure. However, it didn't expand as much as we thought. Shaving cream does have some problems. We learned that for the shaving cream to expand dramatically we would have needed to send it much higher than 1000 feet. We could have sent a thermometer up there to compare the temperature to the pressure and to see if temperature affects the expansion of the shaving cream.