The point of this experiment is to see if the effects of conditions at 100,000 feet into the atmosphere will have any effect on the growth and catalase production of two bacteria and their ability to move inside augur. This experiment is also to use alternative materials in order to make the box better for the environment by using a variety of materials that are recycled, able to be recycled, re-used, and biodegradable.
“Going Green”

- The original materials that are used to construct the typical payload are not recyclable and sit in landfills after they have been used. The second challenge taken on was to replace as many of the materials as possible while still maintaining the integrity of the box.
Comparison of the advised materials against our Green materials.

- Original Materials
  - Foam Board
  - Foam Insulation
  - Hot glue
  - Tube for stringing the balloon
  - Washer & paper clip (2)

- The Materials we chose
  - Recycled foam Board
  - Packing peanuts as insulation
  - Re-used heater & string tube.
  - Non-Toxic/Washable glue
  - Cardstock
  - Washers
Box Layout & Reasoning
The price of our Experiment

Individual Prices

- Bacteria $57.80
- Recycled Foam board - $224.95
- Packing Peanuts $37.27
- Radiation Sensor $226.45
- Batteries (all together) $282.26
- Energizer Battery Charger $37.61
- Washers $2.98
- Reused paperclips, extra heater, and flight tube for string. $0.00

OVERALL COST

- $869.32
BACTERIA

Klebsiella Pneumonia
- Rod shaped
- Catalase
- No Motility
- Glucose; acid and gases
- 3 stage Antibiotic Resistance

Enterobacter Aerogenes
- Rod Shaped
- Catalase
- Motility
- Glucose; acid and gas
- 3 stage Antibiotic Resistance
Growing the bacteria
Testing

- With the challenge of having a different and off the grid insulation, we needed to do every test possible so that we could make sure the packing peanuts could withstand all the obstacles of traveling 100,000 feet in the air: freeze test, drop test, swing test, and the vacuum test. Also, the packing peanuts were tested to see show that they completely dissolve in water.
Freeze test
Swing Test
Drop Test
Vacuum & Dissolving Test
Bacteria Pre-Launch
Post-Launch
Bacteria Post-Launch

K. Pneumonia

E. Aerogenes
According to the data the flight time was about 2.3 hours. This occurs in the middle of the data, so after that point it was sitting in the field waiting for it to get picked up. The outside temperature was expected with the temperature rising and falling with the changes in where the payload was in the atmosphere. The pressure was also as expected almost reaching zero at the maximum altitude. The humidity was higher in the morning and then got lower at higher altitudes, then rising again, but not as high as the original readings.
SUCCESSFUL INSULATION!
Overall Conclusion

- Our payload with green materials and a different insulation lasted flight conditions, but the results of the bacteria were more exciting. The motility of the bacteria was the reason for this difference. The bacteria are structured the same in all areas except motility and our data shows that there is a difference in the catalase production and growth of the bacteria. To come to a conclusion on our experiment, our hypothesis was correct based on the catalytic tests on the bacteria and when we took on the “Going Green” challenge we were successful by having a 62.5% recycled, reused, and recyclable payload.
Shouting out a HUGE thanks to our Advisors.

- Ms. Clements- Main Advisor
- Mr. Desi Maxwell- Biology Lab Provider/Advisor
- Safeway- Generous Donations of Ice
- (not pictured) Karen & Earl
Questions?