Liberty Middle School
Ms. Lyons - 8th Grade Class
Space Hardware Club
BalloonSat Flight 14
Going Up

SpaceHardware.UAH.edu
How do different gases expand?

The experiments were:

• Designed
• Built
• Performed
  – Time-lapse Photo Analysis of 3 gases
    • Yellow – Air
    • Green – Helium
    • Pink - Nitrogen

Picture from 40 minutes in flight.
Photo Analysis

At Launch

40 Minutes After Launch

Which changes the most?

SpaceHardware.UAH.edu
Jorge’s Hungry

• Question:
  What Happens?
  • To Banana
  • To Taco Shells

• Answer:
  • Banana fully develops to nasty black
    • Control has light grey color
  • Taco Shells seem the same as control samples
Banana and Taco Shell

Before Flight

After Flight
What did you all learn?
I will SURVIVE!
So does an experiment need a measurement?

The experiments were:
- Designed
- Built
- Performed
  - But no measurements
  - Inspection afterwards

Happy B-Day +7 days ➔➔➔➔

SpaceHardware.UAH.edu
Compact Disk

• Question:
  
  What Happens?
  
  • In the cold
  
  • In the vacuum

• Answer: Nothing.
  
  • Also, it's hard to tell because someone wrote on the CD...
Light Bulb

• Question:
  What Happens?
  • In the cold
  • In the vacuum

• Answer: Nothing.
  • It looks fine
    • Not broken
    • No apparent damage
Ink Pens and Markers

• Question:
  
  What Happens?
  
  • In the cold
  
  • In the vacuum

• Answer: Nothing.
  
  • They did not pop or explode as hoped for, but them may be dry...

• Lets test it!

SpaceHardware.UAH.edu
Balloons

• Question:
  What Happens to painted balloons?
  • In the cold and in the vacuum

• Answer:
  • No paint - One popped...
  • Paint for plastics
    • Some paint is gone - not chipping off
  • Enamel paint
    • Some paint is gone - Is chipping off
Camera

• Question: What will we see from the bottom of the balloon?

• Answer: An awesome balloon burst!
• It stopped not too much past apogee
  • Storage and battery
  • Cold?

http://www.youtube.com/watch?v=baXkvInpmA0&feature=youtu.be&hd=1
Solar Panels

- The power from the test flashlight supplied more power to the solar panels than the sun did!
- Since the incoming power from the sun was less than 6.33 Watts
- This was very unexpected!
- Unfortunately, we don’t have any useful solar panel power vs. altitude data 😞
  - But, we learned something!

SpaceHardware.UAH.edu
How do we fix this?

• Make the value of the resistors connected to the solar panels bigger!
Soda Can

- **Purpose:**
  To observe the behavior of soda can at high altitude (85,000 ft).

- **Result:**
  - Air pressure above sea level can be calculated as
    \[ p = 101325 \times (1 - 2.25577 \times 10^{-5} h)^{5.25588} \]
    where, \( p \) = air pressure (Pa) \& \( h \) = altitude above sea level (m)
  - As the temperature decreases due to increase in altitude, pressure inside the can increases.
  - Eventually, the soda can popped.
Apple Slices

- **Purpose:**
  To examine the texture behavior of apple slice at high altitudes (85,000 ft)

- **Result:**
  No significant change except that it was cold !!
Calculator

- **Purpose:**
  To observe if the calculator works after exposing to colder temperatures (-70 F) at high altitude (~85,000 ft)

- **Result:**
  IT WORKS !!!!
Popcorn

- **Purpose:**
  To observe if the popcorn pops after being exposed to colder temperatures (-70 F) at high altitude (85,000 ft)

- **Result:**
  Let’s check it out !!

SpaceHardware.UAH.edu
What did you all learn?