Community Service Learning Projects: Education Process Yielding Benefits before Graduation

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**5th-8th Grade Students**

1. Improve general experimental design in students ages 10-14 (5th-8th grade)

2. Apply knowledge of previous concepts to the study of the characteristics and effects of the Earth’s atmosphere on objects

3. Collect data about the characteristics of the Earth’s atmosphere for later analysis and evaluation in the classroom
Learning Objectives

6th and 7th Grade Students
Apply information/data collected on the flight to the study of space flight (6th grade) and search for habitable worlds (7th grade)

Undergraduate Students
1. Apply concepts in radiosonde / balloon trajectory forecasting (METR 3390 Meteorological Instrumentation and METR 3330 Forecasting II)
2. Provide mini-research project experience in lower atmosphere structure data collection and analysis (METR 4315 Air Pollution)
3. Apply concepts learned in METR-4320 Weathercasting II on interviews to explore the St Peter’s student projects
• Experimental design worksheet
  – Developing hypothesis
  – Identifying data to/how to collect
  – Control

• Brainstorming in small groups and then as a class

• Choosing and testing experiment pre-flight
Sixth grade is in charge
Assignments were designed like our version of Mission Control
Students made requests for roles (1\textsuperscript{st}, 2\textsuperscript{nd}, and 3\textsuperscript{rd}) and assignments from these interests were based on need and personalities / strengths
Incarnate Word meteorology students were assigned to:
– Prepared Flight Forecasts
– Make surface observations at launch
– Interview students on roles
– Analyze the resulting data
Landing site forecasts 24hrs in advance with Southampton update on day of launch

Flight Time 2:23:12

230 km east

Student #3

Dr. Mulvey

U of Wyoming

U of Southampton Day of Flight update

Actual Landing Site

Landing
Site Forecasts

Student #1

Student #2

Mr. Tobias

24 hr forecast
Flight Launch

- Jobs/responsibilities have been discussed and reviewed
- Be flexible in unforeseen changes
- Everyone helps
Inflight Data Examples

**Position**

- **KE5GWM-11**
  - RadBug, -47C, mb, 110

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**Properties**

- **Station type**: APRS station
- **Symbol**: Balloon
- **Destination callsign**: CQ
- **Packet path**: WIDE1-1, WIDE2-2, qAR, KA5WMY-5
Post Flight

• Post flight experimentation and evaluation
• Flight/experiment debrief and analysis
• Data analysis and interpretation
• Data application
Balloon Burst

Dragon 2
March 31, 2017
101,412 Feet 19.2 Miles
-76.7 degrees F
Both sets of students practice their communication skills (Broadcast Meteorology and grade school Mission Control Team)

Grade School Students

• Explored science testing their imagination as seeing the results

University students

• High Resolution low level data for case studies in Air Pollution and Micrometeorology
• Experience real world forecasting opportunity and realized the difficulty in forecasting high altitude events.
• Collection of launch time surface observations Broadcast Meteorologist field interview
Lower Level Sounding

Ascent

Descent
• **Summary:** A case study of the on-going service-learning relationship between the University of the Incarnate Word meteorology students and the Saint Peter Prince of the Apostles grammar school science students.

• **Goal:** Encouraging grammar school students to pursue STEM careers, field work training for university students.

• **Results:** For both the grade school and the university students this was a service-learning experience benefiting both groups, by introducing them to real world meteorology before the each reached their respective graduations.

This is a continuing link called “The Brainpower Connection”.
Finally

Don’t mess with the dragon. You are crunchy and taste good with ketchup.