



Near space meteorological probe

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Overview

The aim is to design and make a meteorological probe that is launched and then collected after a 45 minute flight.

The project will be run over a number weeks, with a certain number of hours per week spent on the project; totalling 30 hours.

I am currently looking for a school to partner with me on this project to provide funding and to be involved in the design and delivery of the workshop.

The ideal age range will be 12-16 years old, with a group of about 15.

Description

- The probe should rise to the edge of the atmosphere, or as far as we can go and still have a high chance of recovery.
- The probe should be able to control its own descent with a parachute or similar.
- The probe will have a reasonably high quality camera.
- The probe will be tracked with GPS.
- The probe could be controllable with radio.

Project segments

Segment	Time
Design and specify the probe; at a minimum this will require a way of tracking the probe and a camera to take photos. A more extensive project could record various other aspects of the journey (altitude, atmospheric composition, temperature, etc).	3
Order the parts.	2
Build the payload.	14
Testing.	3
Launch!	2
Recover probe	2
Record, discuss and publish results.	4
	30

Components and Costs

Component	Cost
2 way data packet radio modules	50
Camera	30
Servo motors	20
Balloon	35
Helium	35
Microcontroller and electronics	50
Airframe	30
	250

My standard rate is £200 per day, which works out at £750 for the 30 hours estimated above. Therefore the project costs will be £1000 in total.

Outcomes

This project covers many aspects of Science, Technology, Engineering and Maths:

- Planning and building a complex robotic probe.
- Using maths to work out gas pressures and how this relates to the balloon exploding at high altitudes (low pressures).
- Electronic engineering techniques with building the probe.
- Confidence with working with diverse components to build larger projects.
- Curvature of the Earth; using the photos and maths to work out the size of the Earth.
- Working successfully as a team.
- Documenting work done, making hypotheses, testing theories.
- Excitement of building a near space probe, launching and recovering it along with a priceless cargo of unique photos of the Earth!

Personal Information

- I am a qualified electronic engineer, working with diverse companies as an engineer specializing in sustainability.
- I have been working with schools for over 3 years; developing novel STEM workshops.
- My most recent workshop was developed for SAUCE and involved the construction of a bespoke wind tunnel used by over 600 children.
- My website (www.learning-to-learn.org.uk) has a large amount of information about my projects, including testimonials.
- I have 5M public liability insurance and current CRBs.

Resources

- Near space project wiki - http://mattvenn.net/nearspacewiki/index.php/Main_Page
- SABLE 3 project - <http://www.sbszoo.com/bear/sable/sable3.htm>
- UTARC project - <http://sunsite.utk.edu/~mcoffey/ux-1/>
- Meteotek photos from the Meteotek team - <http://www.flickr.com/photos/meteotek08/sets/72157614847488964/>