



Astrobiology-Scientific Ballooning Model for Career Development

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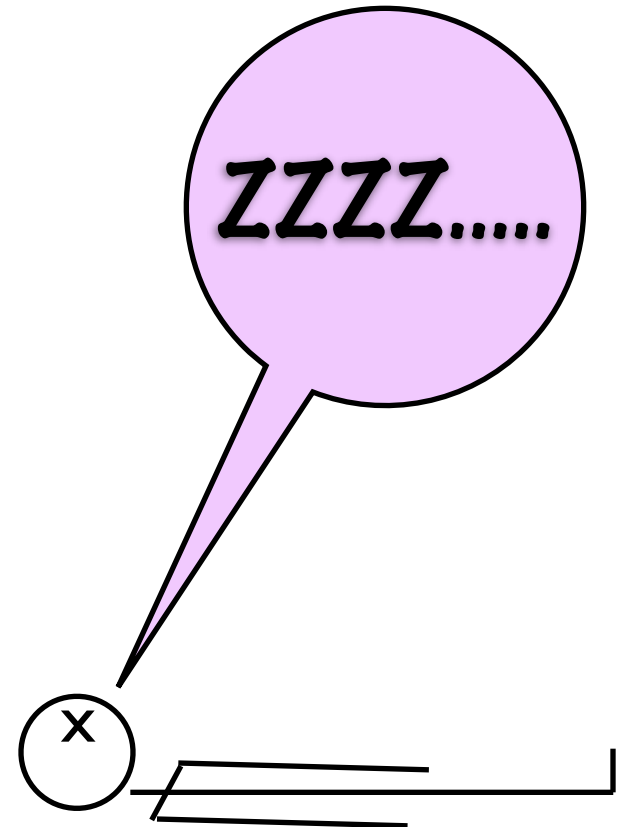
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Too often students are bored by science

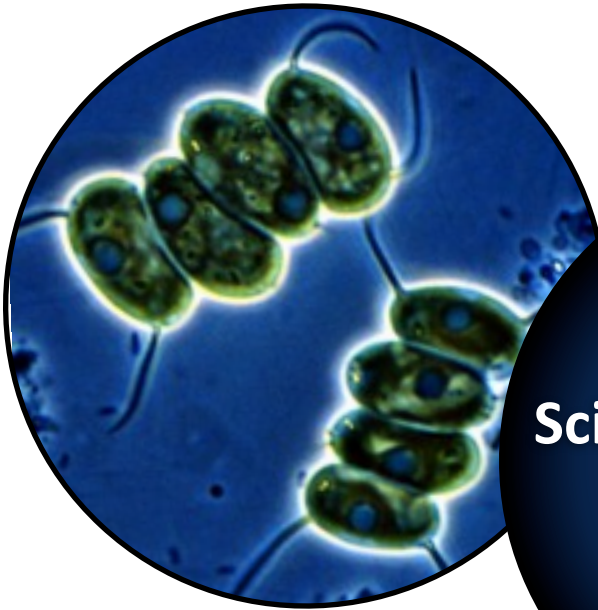
- ★ Uninspiring teachers or poor preparation or overload
- ★ Traditional disciplinary boundaries
- ★ The attitude is conveyed that science is “getting the right answer”. Creativity and exploration of the unknown are absent.
- ★ Oh yes...and too many bulleted lists.





**We are providing
a reason to wake up**

Our solution:



**Astrobiology
Scientific Ballooning
for career
development**

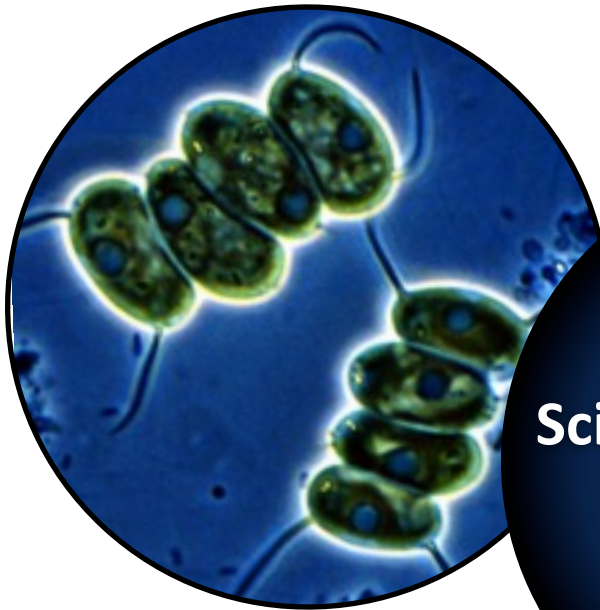


Project Goal

Pilot an innovative Astrobiology-Scientific Ballooning (ASB) model that combines the core elements of Astrobiology in astronomy and biology with the engineering, physics and mathematics focus of Scientific Ballooning using materials that align with Maine's standards, the Maine Learning Results and with the National Research Council's A Framework for Science Education.



Educational rationale



Astrobiology Scientific Ballooning for career development



- ★ The Astrobiology Scientific Balloon model offers a **hands-on approach to augmenting basic science education** via the discussion of topics such as atmospheric properties, weather, phases of matter, plotting skills, and communications in the context of a high-altitude balloon flight.
- ★ Further it **allows participation in a flight mission**, from preparation of payload and engineering to launch and data and platform recovery and an analysis.
- ★ By connecting engineering to astrobiology, scientific ballooning and field and laboratory research studies students will have **first-hand experiences about how exploration drives technology, and engineers and scientists together drive exploration** in this combined design and research mission

Project Objectives

- **Provide opportunities for high school teachers** to build their scientific skills, including data collection and analytical thinking, and their ability to lead students in passionate inquiry related to NASA science mission goals, through engaging professional development activities and ongoing support.
- **Increase student interest in STEM careers** by: (a) informing students about STEM career options, and (b) exposing students to engaging and authentic scientific research experiences integrated with the engineering design challenges of a scientific mission.



Winogradsky columns

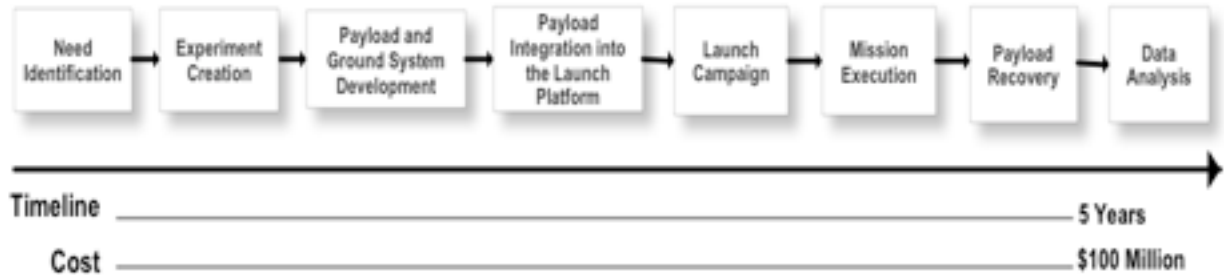


Working with the \$80,000 scanning electron microscope!

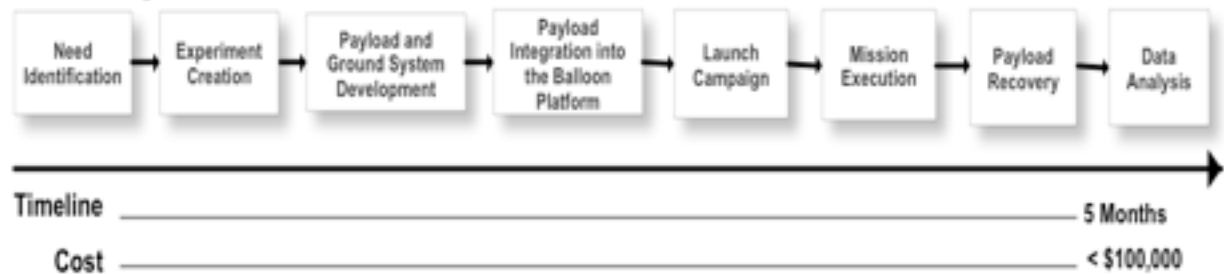
Model

The Astrobiology Scientific Ballooning model in reality is a space program on a small and realistic budget that has obvious and measurable traceability to our goal of increasing student aspirations for STEM careers.

Space Process



Ballooning Process



Space vs Balloon Mission

BioLaunch Payloads

(Stanford Program Rothschild co-founded)

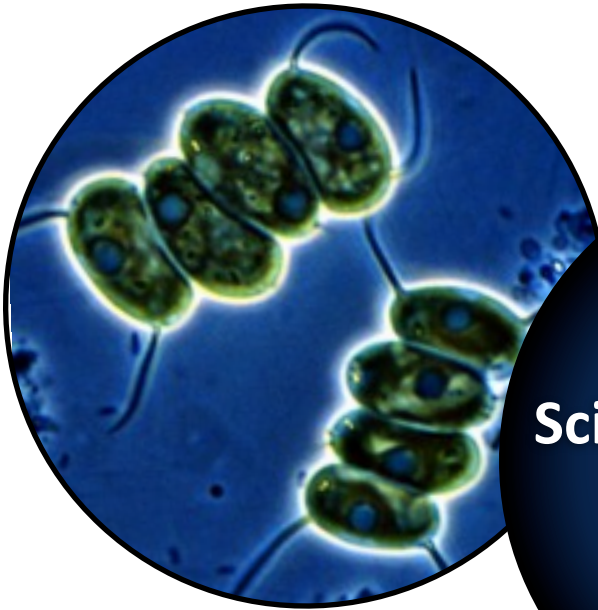
- Physical measurements (solar & cosmic radiation, temperature, photos)
- Prebiotic experiments (polyaromatic hydrocarbons as sunscreen)
- Biological measurements (DNA damage, microbes, tardigrades)
- Equipment testbed (Stanford Aero/Astro SSDL)



Activities: 2011-2 School Year and Summer 2012

- ✓ Identify teachers and students
 - Biology teachers and students in Westbrook, Mount Blue and Winthrop High Schools, Maine
- Teacher Workshops (July-Aug 2011)
 - Palestine, TX – Scientific Ballooning Training
 - Portland, ME – Astrobiology Training and collaborative development of lesson plans
- Classroom and mission planning (Aug 2011-)
 - Curriculum introduction
 - Astrobiology payload development
 - Launches
- STEM Career Awareness (Aug-)
- Capstone Event (June 2012)
- Evaluation (Aug)

Jan 2011
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