



University of Michigan Provost's Teaching Innovation Prize

2014 WINNER



Mark Moldwin
Professor
Atmospheric, Oceanic and Space Sciences
College of Engineering
mmoldwin@umich.edu

Sponsors:

Office of the Provost

Center for Research on Learning and Teaching (CRLT)

University Libraries



Doing Science Firsthand Through Dorm-Room Labs

Innovation Description

Identifying students' most common misconceptions is a strategy for focusing interventions that can yield tremendous payoffs in student learning. Dorm-room labs offer a method for moving difficult concepts off the "wrong answer" list. They are particularly valuable in large, introductory science and engineering courses whereby non-majors can fulfill a breadth requirement, yet lack access to fully equipped lab classrooms.

Dorm-room labs consist of short activities followed by a few questions and a highly structured lab report. They cover abstract concepts that are less familiar to students. For example, inexpensive UV Color-Changing Beads enable students to conduct experiments in almost any setting, including their dorm rooms. As they have fun determining which materials block ultraviolet light most effectively, students are practicing valuable skills, such as plotting data.

The genius of this innovation is that it attacks misunderstandings at the root. Instead of passively receiving content knowledge, students actively participate in a process of collecting and interpreting data. As a result, not only do they understand abstract concepts more concretely, but they also know *how* they know. The better they can synthesize course content into a conceptual framework, the more likely they are to develop deeper understanding.

Comments

"Dorm-room labs are excellent tools for teaching abstract science concepts, and they are easy/affordable to implement in any large lecture."

"More dorm-room labs!!!"

"Students performed well on exam questions pertaining to lab concepts."

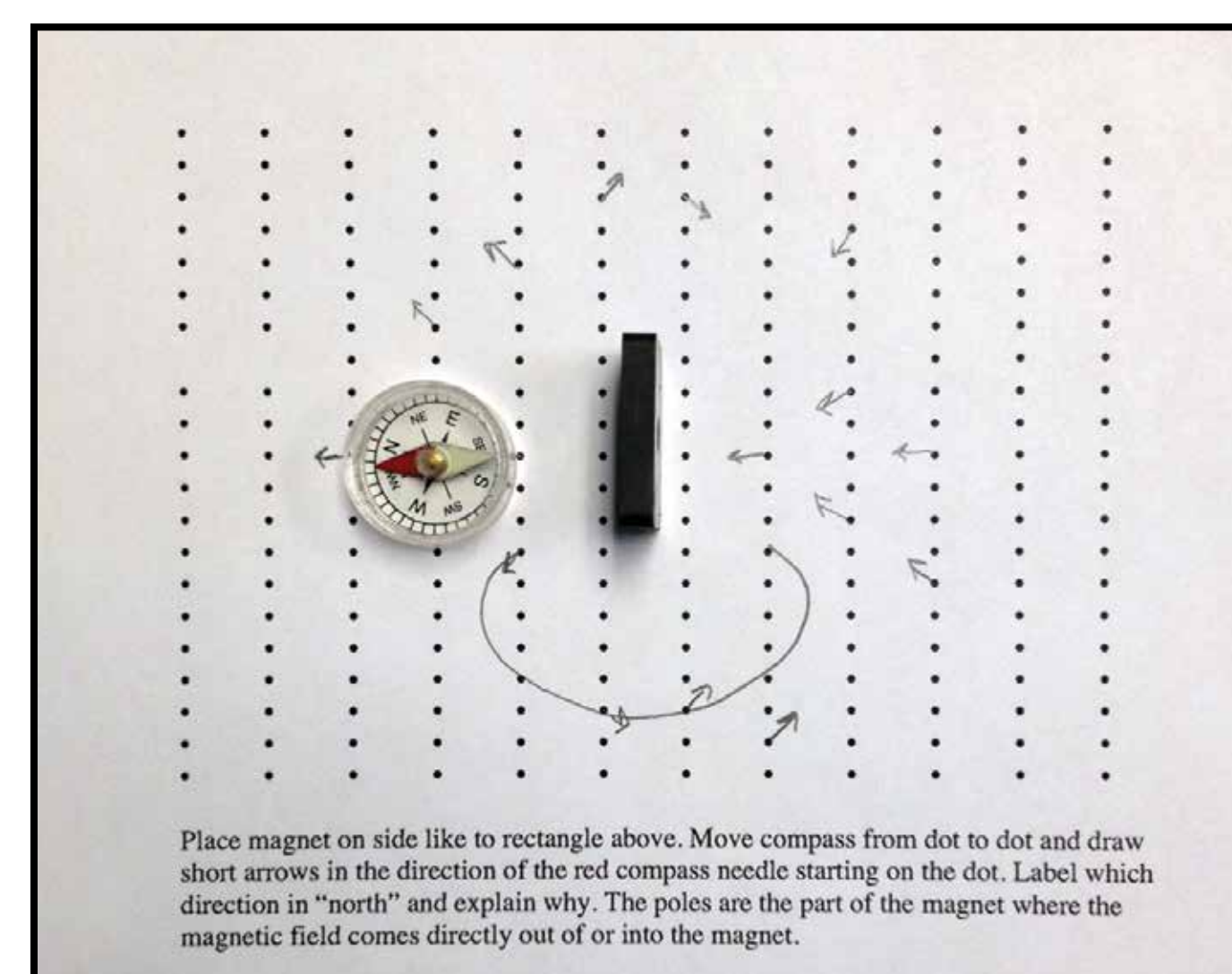
Building a soda straw rocket at home and "varying the length of the rocket or nose cone revealed a fundamental physical relationship in a fashion that was both fun and instructive."

"Many students put demonstrably more effort into the dorm-room lab assignment than other, more traditional assignments."

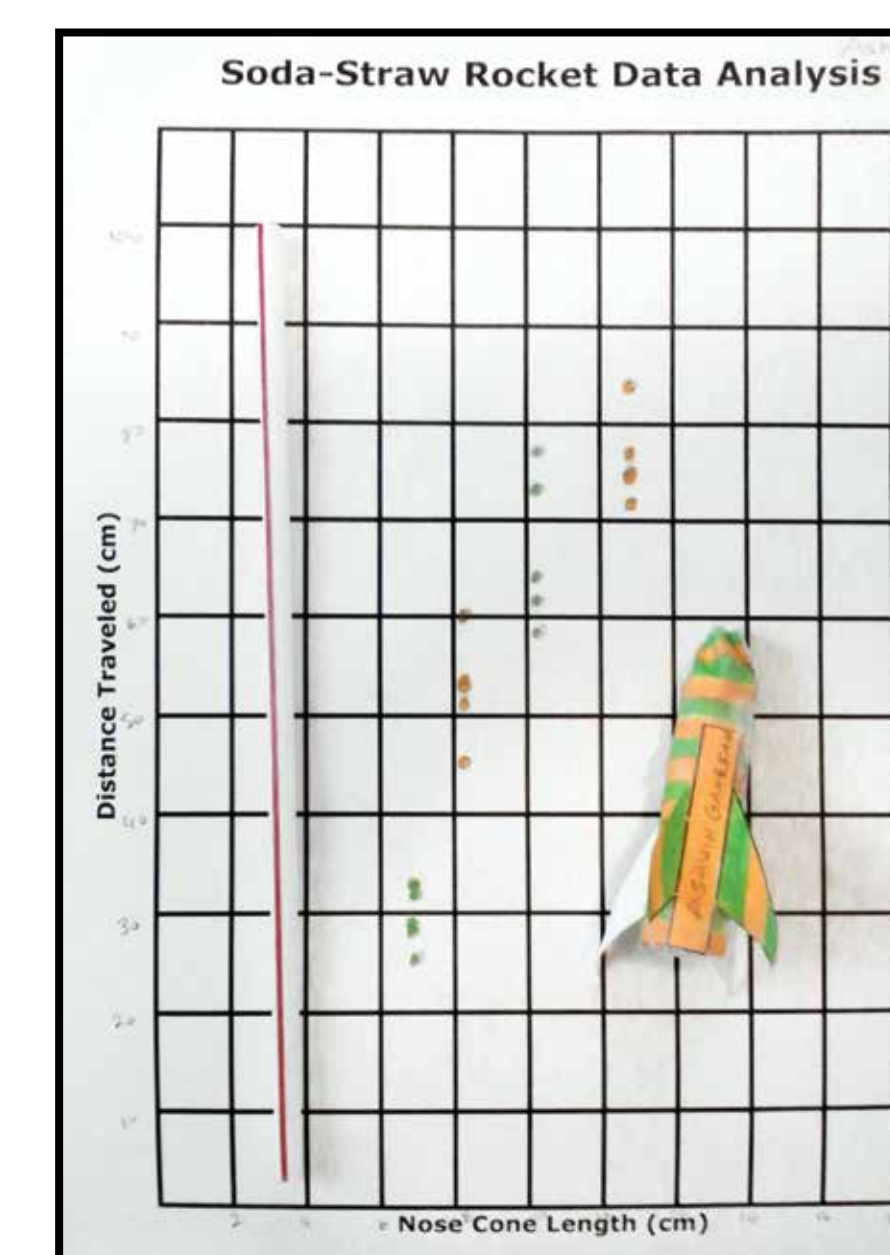
Initially "wary of dorm-room labs due to their unfamiliar nature, we soon learned that science is often more fun when you are actually doing it."

"Many students submitted pictures or videos of themselves having fun doing the experiment."

Examples of Teaching Innovation



Simple low-cost compasses are provided to students with a kitchen magnet for them to map the dipole magnetic field.



An example of a student's rocket experiment results along with her rocket.



A student finding different elements in lights around Ann Arbor as part of her spectroscopy dorm-room lab.