



Radio Waves

News you can use for license instruction and radio science education

ARRL — The national association for AMATEUR RADIO

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Don't Miss...

Amateur Radio attracts many people with disabilities, so instructors need to stay current on how to best help students with special needs. *Radio Waves* readers will want to check out the article on the topic in July's *QST*, written by Patrick Tice, WAØTDA, Coordinator, Courage Kenny Handiham Program. It describes technology tools and tips that make the path toward licensing and upgrade easier.

Scaling Heights to Teach Remote Sensing

BY THOMAS ASK, AC9L

Motivated by the ARRL Teachers Institute TI-2 workshop “Remote Sensing and Data Gathering,” I dusted off my old Drake TR 22 radio and set off for the cliffs in the nearby McIntyre Wild Area with a goal in mind: data collection.

I'm a professor in the Industrial and Human Factors Design department at the Pennsylvania College of Technology, an affiliate of Penn State University, and I wanted to put what I'd learned to good use for our SIMS (Society of Inventors and Mad Scientists) club, for which I am the faculty advisor. The workshop introduced, among other hands-on projects, a buoy system for deploying sensors for environmental studies. By making some gentle tweaks to the original design, I adapted it so I could investigate microclimates of the cliffs.

I routed a ¼ vertical antenna to the top of the cliff and wedged the radio, microcontroller, and battery into a sheltered rock shelf. From this equipment, I ran cables into a couple of interesting cracks and measured rock face and air temperature. I used a pen cap as a radiant shield for the air temperature and foam-taped the thermistor to the cleaned rock surface. I could now explore the changing temperatures deep in cracks where all sorts of creepy things live.



Elayna Ask (author's daughter) testing cliff radio. (Photo by Thomas Ask, AC9L)

The system worked great and I enjoyed watching data stream in from the comfort of my office chair. The APRS-routed sensor data showed how different rocks, with their differing thermal conductivities and shapes, affect interior temperatures.

This, however, is just one possible application of Amateur Radio remote-sensing technology for my engineering and sustainability coursework for second year students in the program. My students will also be using rockets and aviation photography to learn about basic control systems, data processing, and sensor technology.

Thomas Ask, AC9L, is a licensed Professional Engineer with a doctorate in industrial design. He holds an Amateur Extra license.

