

QuarkNet

Helping Develop America's Technological Workforce

Cosmic Ray Studies

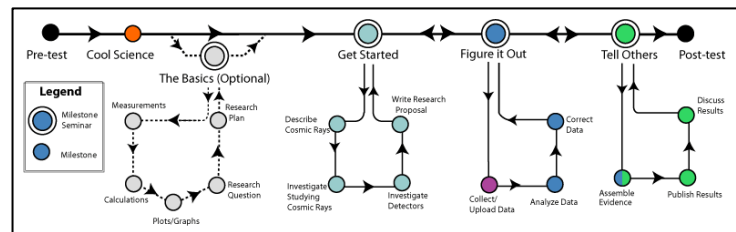
Detector Kits: QuarkNet high school physics teachers receive detector kits for use in their classrooms. We also provide leased Data Acquisition Cards (DAQs) to non-QuarkNet customers.



Kit Contents: 4 “counters” and photomultiplier tubes, power box, DAQ, GPS antenna and temperature sensor which can be placed outside. The DAQ creates a formatted message that can be sent to a computer and collected in a text data file through a USB interface. Computer commands set parameters for each experiment, monitor the data stream & display parameter settings and other important information.

Data Analysis: Students upload and analyze cosmic ray data using our e-Lab, an online environment. From start to finish this is a student-led, **teacher-guided** project.

The e-Lab welcomes all teachers—international and U.S—providing the tools they need to guide students through cosmic ray investigations from learning how to ask a good research question to preparing an online poster summarizing results.



Students explore what cosmic rays are, where they come from and how they hit the Earth. Students have a chance to gain their own understanding of cosmic rays and may be fortunate enough to capture a rare highly energetic cosmic ray shower on their classroom detector and analyze their results. Students can coordinate investigations spanning over distance and time with the e-Lab.

Schools with cosmic ray detectors can upload data to a virtual data portal where ALL the data resides.

Detector 6690, 9 files			
Tue 03 646 events	Wed 04 2,732 events	Thu 05 2,668 events	Fri 06 2,629 events
Sat 07 2,792 events	Sun 08 2,728 events	Mon 09 2,721 events	Tue 10 2,779 events
Wed 11 1,724 events			

This approach also allows students to analyze a large body of data and to share these data with students at other schools worldwide whether or not those schools have their own detectors. For teachers who prefer a customized analysis, the e-Lab provides downloadable flat files to input into Excel or Google Docs.