



Sanford

Underground Laboratory at Homestake

Education & Outreach Spotlight

In this Issue:

Welcome

Beyond Physics

Sensors Detect Earth Tides

Dakota Life

Videos and Podcasts

Curriculum Integration

Teacher Inservice

Upcoming Events

Welcome

The Education & Outreach Spotlight for 2010 is back! We thank you for your patience and hope that you will find it worth the wait.

In this edition, we'll try to fill you in on what we've been up to lately by highlighting some current science experiments and achievements. In addition, we are excited to share information about a few upcoming educational events and opportunities.

Beyond Physics

As the Underground Laboratory at Homestake continues to grow, its impact won't just be measured by the potential for groundbreaking physics research, but also by its effects on the fields of biology, geology and engineering.

Homestake is the deepest mine in North America, with rooms down to 8000 ft., and is well-suited for experiments that require shielding from cosmic radiation: in particular the search for neutrinos and dark matter.

Additionally, numerous tunnels, shafts and well known patterns of water flow also permit studies of the dynamics of the earth's crust and rock mechanics over long time scales. Furthermore, Homestake is well-suited for studies of microbiology and life at extreme depths.

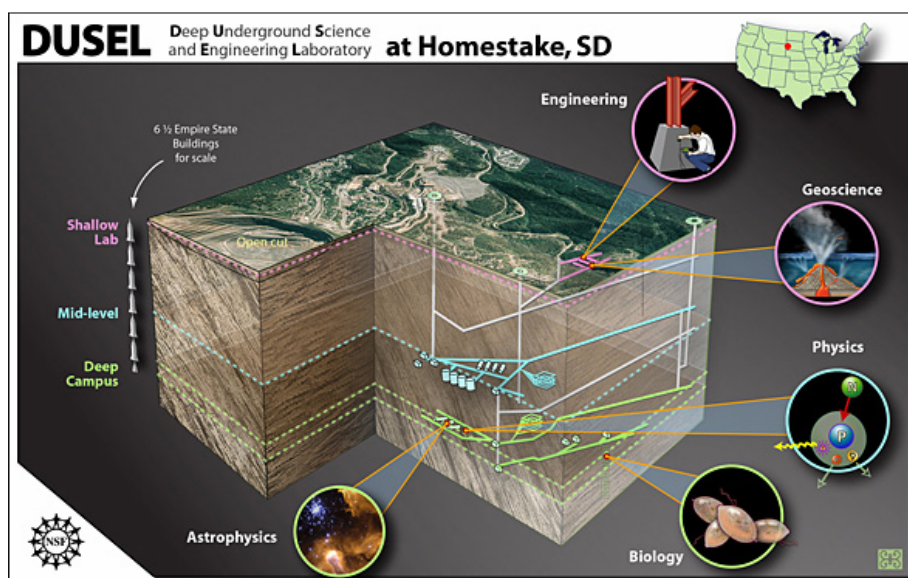


Image by Zina Deretsky, NSF



SDSM&T student Jason VanBeek connects data logger on 4550 Level of Homestake.

Hydrostatic sensors detect "earth tides"

A series of sensors installed at the Sanford Underground Laboratory have the ability to measure ground movement so precisely they can detect minuscule changes in the rock caused by the moon's gravity -- "earth tides." The primary purpose of the arrays is to provide detailed data on ground motion due to dewatering, seismic events, and excavations within the mine.

Hydrostatic systems operate on the principal that water seeks its own level. Arrays of long, water-filled tubes connected to pools are monitored by electronic sensors that stream data over telephone and fiberoptic lines. The arrays can detect changes in elevation of millionths of a meter.

Measurements such as these will be critically important as technicians, engineers and scientists move into Homestake's lower levels to enlarge caverns and carve out new ones for sensitive experiments.



Dakota Life

SDPB Television regularly goes in search of the things and people that make our state unique. The result is a show dubbed "Dakota Life."

A recent episode entitled *Innovation in South Dakota* featured students participating in the Davis-Bahcall program as they performed experiments at the Sanford Underground Laboratory in Lead.

To view this segment, visit

<http://www.sdpb.org/tv/shows.aspx?MediaID=57796&Parmltype=TV&ParmAccessLevel=sdpb-all>

To view the entire episode, visit

<http://www.sdpb.org/tv/shows.aspx?MediaID=57790&Parmltype=TV&ParmAccessLevel=sdpb-all>

Students participating in the 2009 Davis-Bahcall Scholarship Program



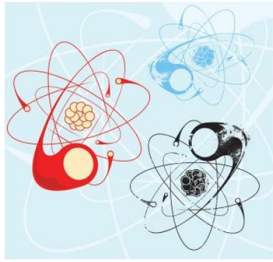
Video and podcast content now available

Drum roll, please...You ask and we deliver! Video and podcast content is now available through the Sanford Underground Lab website.

If you have yet to visit our website, now is the time! Simply click on the link below and choose either *Videos* or *Podcast* from the navigation pane on the left side of the page.

<http://www.sanfordundergroundlaboratoryathomestake.org/>





Integrating Underground Science into the Physics Curriculum

Dr. Peggy Norris, Deputy Director for Education and Outreach, has been working with high school teachers in the Sioux Falls School District to develop a pilot course in conceptual and modern physics and to include physics concepts related to the underground lab in Lead.

The course is now under development and set to be offered at two high schools next fall.



Spearfish Science Teacher Day

Twenty-five K-12 science teachers (and student teachers) from the Spearfish school district attended a science inservice day at Sanford Lab on January 18. The teachers learned about cosmic rays and underground biology in the morning. In the afternoon, they toured the Waste Water Treatment Plant, and then constructed their own filters. After filtering the mine water, they conducted testing to measure levels of: pH, turbidity, dissolved oxygen and dissolved solids.



Spearfish science teachers and student teachers filter and run tests on mine water



Upcoming Events

Mark your calendars for a **Neutrino Day** celebration at Sanford Lab scheduled for Saturday, July 10th.

Details to be announced.

Teacher Workshop- *Physics of Atomic Nuclei

PAN* Underground, a hands-on workshop for teachers of physical science, chemistry and physics, will be offered on the campus of Northern State University on July 18-23. Two units of graduate credit are available for the workshop plus an additional two units after completing online follow-up activities next school year.

For more information, contact Peggy Norris
pnorris@sanfordlab.org



*Until next time
Keep up to date*

Feel free to download the PDF
and print copies for your friends.

<http://www.sanfordundergroundlaboratoryathomestake.org/>

<http://twitter.com/SanfordLab>

<http://www.camse.org/underground/news.php>