

Feedback

From the Teachers:

"The ideas we bring will reach a much broader student base than if we were working independently."

"Having access to experts in the field"

"Real time correlation of theory with practical application"

"Make use of the push to incorporate project based learning and 21st century skills."

"Sharing ideas with other teachers."

"One of the biggest benefits of SWAC is the exposure to tools that are available to teachers that can be used in the classroom...THAT'S HUGE!"

From the Students:

"I like going outside and taking our own data like real scientists!"

"When we did the weather books it really helped me to understand the symbols and the clouds. It helped by doing it every day to get practice. I can now use those terms and skills to understand the weather on The Weather Channel."

"I would rather be in science..."

**For more information on SWAC,
please contact:**



SWAC Team 2010

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What is "Satellites, Weather, and Climate" (SWAC)?

The *Satellites, Weather and Climate* (SWAC) program at the University of Vermont began in 2008 and concluded its pilot phase in 2010. It is an innovative professional development opportunity for in-service K-12 science and mathematics teachers to deepen their content knowledge in the atmospheric and climate sciences, while acquiring geospatial skills that could be used in the classroom. Teachers participate in both a Summer Institute and monthly meetings during the academic year. Core content in climatology, meteorology and engineering is presented in "learning modules", accompanied by "hands-on" practical exercises. SWAC teachers then use a process of Backward Design and Project-based learning to create inquiry-based learning experiences for students. Their progress through the program is tracked by formative and summative assessments.



CricketSWAC Construction

Why is SWAC important?



SWAC Weather Balloon Launch

SWAC's uniqueness lies in its combination of content knowledge and 21st century geospatial skills to stimulate interest in the STEM disciplines, as a way of fostering science literacy. SWAC's core concepts have a widespread appeal and relevancy allowing both teachers and their students to become more climate literate. In the pilot phase alone, over 506 students were served by the SWAC program in such classes as earth and physical science, global studies, honors physics, American history and biology. Participating teachers use social constructivist theories of teaching and learning to create inquiry- and project-based activities and units containing up-to-date scientific content and methods and geospatial technologies (e.g. Geographic Information Science and Remote Sensing). They also benefit from the ability to share ideas and approaches with other teachers from around the state in the SWAC Teacher Learning Community.

SWAC Learning Modules

Introduction to EMR and Satellites:
Background knowledge on the Electromagnetic Spectrum (EMR). Application of EMR to satellite remote sensing/imaging as well as atmospheric/land processes.

Cloud Identification and Monitoring:
Study of cloud types and the methods involved in their identification. Strategies for implementing this knowledge through instrumentation and field recording.

Weather Interpretation:
Fundamentals of forecasting and weather interpretation. Information from the Satellites module presented again in the context of meteorology.

Tropospheric Profile Creation:
Project-based module that uses custom CricketSWAC sensors developed for use in SWAC. Sensors are launched on a weather balloon, and data are recorded and plotted in an atmospheric profile.

Land Surface Interpretation:
Background science and practice in interpreting and understanding Remotely Sensed imagery.

Applied Interpretation Case Study (Permafrost):
General skills learned in the Land Surface Interpretation module are refined and applied to a more specific field to demonstrate how the techniques can be used to accomplish learning objectives.

Geographic Information Viewers:
Exploring various computer software packages that can be used in the classroom to view, edit, and create geographic products both for students, as well as by students.