

Learning Science on a Mountain Glacier

“Not many people my age can say that they climbed on a glacier (or experimented on it!), but I can,” declares student Tiffany Riesenberg, a 2006 participant in the Girls on Ice (GOI) program. “I had never applied science to the outdoors like I did with Girls on Ice, and it made me realize that science is actually really exciting and interesting.”

GOI is an environmental learning program offered by the nonprofit North Cascades Institute (NCI) of Sedro-Woolley, Washington. Every summer since 2000, field glaciologist Erin Pettit has taken a group of girls ages 15–18 on an expedition to Mount Baker’s Easton Glacier to study climate change and glaciology, learn field research skills and mountaineering, and develop leadership skills. Having worked in informal science education, Pettit started GOI after “seeing how field experiences inspire and stimulate young scientists (including myself).” Most students don’t receive “real field experience” until college, she points out, so GOI gives them “a head start” in science.

The program pays all expenses except for travel to and from Seattle, where the trip begins, and requires about \$2,000 per student. Funding comes mainly from donations to NCI, with supplements from grants including one of Pettit’s National Science Foundation research grants. The tuition-free arrangement results in a diverse mix of personalities, ethnicities, cultural backgrounds, and life experiences, notes Pettit, and applications come from students worldwide. “Even though girls could come on full scholarships before,... having to ask for a scholarship limits how many will go through the effort. Opening it up to all tuition-free really brought out the interest of every girl.”

Selecting participants is challenging, she admits, because GOI seeks “girls who we can see have the best chance at being truly impacted by the program. We don’t want the straight-A student who has a resume packed with extracurricular activities.” Instead, “we look for girls who are excelling in certain



Girls on Ice participants spend part of their summer conducting scientific research on a glacier on Mount Baker in Washington State.

areas, or who show promise but have something they are struggling with,” such as family issues, shyness, or uncertainty about liking science. Diversity is a big issue, she adds, “because the Earth sciences are not doing as well as engineering and biology at bringing in minorities, [although] Earth science does a bit better than engineering in bringing in women.”

Participants also must also be able to hike as much as eight miles over uneven terrain and through snow, carrying a backpack weighing nearly 50 pounds. “We don’t baby them,” asserts Pettit. “They have to set up tents, cook, do everything.”

GOI challenges girls intellectually “not only with the science side of things, but also with seeing things through different perspectives,” explains Pettit. “We have been using art a lot in the last two years because the open mind that an artist needs to see and paint a landscape is the same kind of open mind a scientist needs to see

and begin to understand a landscape from the science perspective. We also ask them many science philosophy questions: What is science? What is a wilderness? How does the media use and portray science?”

Pettit is adamant about avoiding “canned” experiments. “The girls generally design their own experiments, sometimes driven by discussions we have, sometime driven by requests from other scientists.” Last summer, for example, a curator at the Museum of the North in Fairbanks, Alaska, requested specimens of ice worms, so the girls designed “an experiment to understand how ice worms move through the ice [and] where they are at what times of day.” Other group projects include ablation studies (“how snow melts differently with different amounts of dirt on top”), time-lapse imagery of glacier movement, crevasse depth and width measurements, alpine meadow vegetation surveys, and melt-water stream studies.

Mountaineer Cecelia Mortenson and a rotating third instructor, often a graduate student, accompany Pettit on these treks. While ensuring the girls’ safety, the adults encourage them to be self-reliant. On day one, recalls Laura Andrich, a 2008 participant, “we spent the day at ‘snow school,’ where the instructors taught us self rescue with ice picks.”

Teamwork is also crucial. “We got into rope groups and learned about climbing together with harnesses,” says Laura. Because “we had to rely on each other constantly, the girls and I became exceptionally close,” recalls Tiffany.

Climbing Mount Baker “was one of the hardest things I have ever done in my life so far, but it was definitely one of the best things,” says Laura. “I went up with a large backpack, but I came down with knowledge, experience, and memories that will last a lifetime,” concludes Tiffany. ●