

Girl Scouts sell cookies, but they study optics too

Science & Technology Education

Spotlight on inspiring the next generation of scientists & business leaders

An OSA Foundation program developed in collaboration with the Girl Scouts of the USA introduces girls to basic concepts in optics and encourages the study of science.

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The inequities in educational resources and student achievement in the United States and around the world are extreme. Will we be able to address these issues in a meaningful way? If so, how can progress be accomplished, in what timeframe, and at what cost? If the solutions were easy, we would have already put them in place. Instead, we must patiently work to make incremental improvements to the best of our abilities and with the understanding that advancements will be made over time and through the efforts of many.

When it comes to the field of physics, the statistics for BS and PhD degrees awarded to female, black, and Hispanic students in the United States inspire a serious call to action. And while this situation is by no means confined to one country, the American Institute of Physics (AIP) has collected some disturbing data on degrees awarded in the United States. Visit osapod.libsyn.com to access a podcast and slide presentation on this topic that was delivered by Rachel Ivie, research manager with the Statistical Research Center of the American Institute of Physics during the May 2007 Women & Minorities in OSA event.

When we look at U.S. high school students studying physics, the numbers look pretty encouraging, with females representing nearly half of the population, according to the AIP High School Physics Teacher Surveys (see graph below).

But while women in the United States earn a little more than half of all bachelor's degrees and about 45 percent of PhDs in all subjects combined, they earn only 21 percent of the bachelor's degrees and 14 percent of PhDs in physics. This is sometimes referred to as a "leaky pipeline" because while there are plenty of females in the high school pool, a large portion of that group does not choose to continue on with advanced studies.

Perhaps one reason girls are under-represented in physics is that there are relatively few female teachers and role models. Data collected show that between 2005 and 2006 only 31 percent of U.S. high school physics teachers are women and 13 percent of physics faculty and 11 percent of physics department chairs are female. The situation is far graver for black and Hispanic students, with advanced physics degrees and faculty representation for each group falling far below their respective representation within the total U.S. population.

Realizing that our field depends on the interest of upcoming generations, many in the physics community are taking action to support education outreach efforts within and outside classrooms. A variety of organizations are likewise focusing their efforts on education. For instance, the Optical Society of America Foundation (OSAF) has set its priorities areas to include three areas: advancing youth science education, supporting optics and photonics education in developing nations, and providing education and resources to underserved populations.

One of the ways in which the OSA Foundation puts its strategy into action is through programming partnerships such as its collaboration with the Girl Scouts of the USA. Recently, the OSAF and the Girl Scouts published *Lighten Up! Discovering the Science of Light*, an activity booklet that helps introduce girls ages 11 through 15 to optics. The publication includes basic scientific concepts and features a number of fun, hands-on experiments that can be conducted using everyday household items. To download the booklet, visit: www.studio2b.org/gossipyouneed/lighten_up.asp.

A pilot program with ten Girl Scout Councils is now under way. Low-income and minority students are among the girls served by these councils. During the test program, troops will work with the activity booklet with the assistance of the members of a local section of an OSA Student Chapter. Volunteer involvement is key, in that it provides the opportunity for experts to help explain the educational material. Further, it gives the children the opportunity to meet real scientists and engineers in the field.

While this program is only in its early stages, it has rightfully generated a great deal of excitement. It is a great demonstration of how groups of individuals and organizations can pool their resources and expertise to help students that might otherwise be overlooked or given the impression that the study of science is outside their reach.

The OSAF is recruiting volunteers and financial supporters for the Girl Scout program, as well as other programs. Please contact the foundation and visit its Web site to learn more (www.osafoundation.org; e-mail: foundation@osa.org; tel: 202-416-1421).

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