

SMITH COLLEGE PROGRAMS FOR ENCOURAGING
GIRLS IN MATH AND SCIENCE

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Smith College has recognized for some time that women are arriving at the College door unprepared to continue in math or science studies at the college level, and unaware of the career opportunities that exist in the sciences. To address these issues, several years ago the College initiated an annual workshop called "Current Students/Future Scientists and Engineers" which will be presented for the 7th time this June. To address the issue of girls dropping out of math and science, TRI-ON, Math/Science/Engineering, a day of science at Smith for 9th and 10th grade girls was initiated; it has just completed its 3rd year.

Current Students/Future Scientists and Engineers Workshop

The "Current Students/ Future Scientists and Engineers" (CS/FSE) Workshop is one of the present programs which we believe addresses the need for more women and minorities to pursue careers in math, science and engineering. It is designed to help teachers and counselors develop programs (Implementation Plans) within their schools that will encourage students of all abilities, especially young women, to continue their studies in math and science in high school. Participation in the workshop requires that only teams composed of a math or science teacher AND a counselor can apply. Each participant receives a \$100 stipend. The goals of the Workshop are:

1. To encourage students of all abilities, especially young women, to take math and science courses throughout high school.
2. To provide concrete information about career opportunities for women who are interested in math, science and engineering.
3. To share workshop goals with staff, students and parents through the development of Implementation Plans in the school community.

Through panel discussions, keynote addresses by well known women in the sciences, speakers (mostly female) from high tech industries, small group discussions, and hands-on laboratory sessions, the workshop participants are

immersed in the world of science and engineering. Since the program was initiated in 1983, 316 teachers and counselors from 123 schools in the Northeast have participated. We estimate that over 20,000 students in grades six through twelve have participated in various school programs that have been established as a result of the workshop.

The workshop takes place in late June on the Smith College campus when teachers and counselors and college faculty are available. All activities during the workshop are designed to enhance the workshop participants' understanding of and commitment to the above goals. The activities are also directed at sharpening participants' thinking about ways in which they can implement the workshop goals in their own schools and communities. The workshop participants are immersed in the world of science and engineering so that they may leave the session more knowledgeable about the possibilities that exist in the field and stimulated to transmit their enthusiasm and new information to their students, colleagues, administrators and to parents. Workshop activities which usually focus on one or two main themes include:

1. Opening dinner and keynote address: a keynote address by a well known female/minority scientist or engineer or an experienced researcher interested in the field of women in the sciences sets the tone for the rest of the 3-day session. All collaborating parties (participating teachers and counselors, the Planning Committee, school administrators (principals and superintendents, corporate, and community outreach representatives, and Smith College faculty and administration) are invited to this event.
2. Two panel discussions: The first panel is comprised of women/minority scientists and engineers who are involved in state-of-the-art projects such as "the Boston Harbor Clean-Up Project". Each panelist discusses her role in the project and introduces the participants to the excitement inherent in undertaking such a technical task. The second panel consists of women mathematicians, scientists and engineers who describe how they became interested in their field, the factors that influence their career decisions and the obstacles, if any, they encountered as professional women. We also include some women who combine career and family.
3. 'Hands-On' laboratory sessions: In these sessions the math/science teachers and counselors actively engage in scientific experiments led by members of the Smith College math and science faculty. It is a time when math and science are portrayed as fun, interesting and do-able. Counselors, many of whom have not been in a laboratory for years, as well as the math and science teachers come away from this 2-hour session with enthusiasm and a determination to transfer this enthusiasm to their students when advising for course selection. These laboratory sessions also offer experiments and materials which can be easily incorporated in to the class curricula.
4. Development of the implementation plans: Before the end of the workshop, each participating team develops an outline for their school plan to

be implemented in the fall. The plans can involve students, colleagues, administrators and/or parents. The purpose of the plan is to alert the targeted audience to the broad range of science and engineering career choices open to students if they continue to take math and science in high school.

Communication/collaboration after the 3-day workshop:

Throughout the following school year, we remain in contact with the teams to collaborate on the development of their plans, to offer assistance, and to send them additional resource materials. The plans assembled in the fall and are published in a manual. Each participant and his/her school principal and superintendent receives this publication. Upon completion of the plan each participant receives a Certificate of Participation.

Follow-Up Day

In the Spring most of the workshop participants, the Planning Committee, and invited members of the present and prospective corporations and community supporters of the program meet at the Smith campus for one day. Three or four of the most successful implementation plans are presented by their respective school teams.

In the afternoon Smith science students present their current research to the group. The Follow-Up Day is an important culminating activity. It is the time for the entire group to hear about what their colleagues are doing in their schools and how they managed to transfer the goals of the workshop into effective and meaningful activities. Furthermore, it sustains the enthusiasm and support for continuing the activities into the future years for the participating schools.

TRI-ON MATH/SCIENCE/ENGINEERING, A Day of Science at Smith

In our work with teachers from the public schools in the CS/FSE Workshop, we have been made even more aware of the numbers of girls of ability that continue to underachieve in their math and science studies. TRI-ON, A Day of Science at Smith College targets underachieving girls and seeks to inspire them to develop their abilities. Specifically, we work in collaboration with CS/FSE teachers from Massachusetts in planning TRI-ON so that it is appropriately targeted at the needs and concerns of the early high school female student.

The goals of the TRI-ON Workshop are:

1. To experience that math and science are exciting and fun through hands on science and math workshops.

2. To provide successful female role models, thus addressing the myths associated with excellence in math and science and being female.

3. To raise interest in careers in math and science among the targeted group.

We involve the high minority public school systems in the western half of Massachusetts, and work in collaboration with teachers from these districts in planning the event. TRI-ON involves 7 to 9 public school systems (our limiting factor is the availability of labs for the hands-on portion). The girls attending TRI-ON are selected by the teachers who plan the workshop; we seek girls who have demonstrated ability, but who are performing below this ability, either because of a lack of motivation or direction. Minority participation is encouraged.

1. 'Hands-On' laboratory sessions: Through hands-on science, computer science and mathematics workshops, the girls are immersed in the kinds of activities they can expect to be doing on the college level in math or science. The purpose here is to show that science and math are do-able, wide-ranging, fun, and exciting. The workshops are presented or assisted by Smith students working under the auspices of their professors. The Smith women serve as important role models since they are finding success in math and science. Smith students are delighted to participate in TRI-ON.

2. Lunch sessions: The TRI-ON lunch is a sharing session of 3 or 4 high school girls and is led by a Smith math or science student. Using a very directed script, the Smith students talk about the obstacles they have faced in pursuing math and science as well as their anticipated rewards. Topics to be discussed include:

'Does it matter which courses I take?'

'If I take the classes you suggest I won't be in the same science classes with my friends.'

'I have good grades now, but if I take those harder courses my grades will drop.'

Smith students aim at dispelling the myths associated with excellence in math and science and being female, and also the need to obtain all 'A's in math and science. Smith students are asked to recognize that they may be the only college student these girls have ever talked to.

3. Panel discussion: A final panel discussion with Smith College math and science majors publicly shares the issues of females and excellence in math and science.

4. TRI-ON teachers: TRI-ON teachers bring their students to campus, and

spend the day as well. Our strategy is to separate students from their teachers, and program the teachers time separately. During the hands-on labs for students, teachers are learning about some of the new things that are happening at the College. This year a math professor did a computer workshop with the TRI-ON teachers, and the Director of the Biological Center took them on a guided tour of the botanic gardens. Lunch consisted of 28 educators (18 public school teachers and 10 Smith faculty) engaged in a 2-hour sharing session. Overall it is a day when the college and public school faculty meet on a professional level.

5. Parent involvement: After the workshop parents of participating girls receive several mailings. In these letters parents are asked to participate in the goal of encouraging their daughters to take math and science throughout high school. We also make financial aid information available to both student and parent.

Underachieving girls with ability in math and science must have access to female role models who are successful in these abilities and who can encourage them to continue in these areas. TRI-ON answers these concerns in a positive hands on manner which leads to hope for the future.