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ABSTRACT

The National Science Foundation found that fewer female and male students are going with math- and science-related college majors, including engineering. This pamphlet offers tips and strategies for counselors and school administrators to assess how females participate in math and science courses in their schools. Sections of the pamphlet include: (1) "Is There a Problem Nationally?"; (2) "Is There a Problem in Your School?"; (3) "Scheduling: The Secret Weapon"; (4) "The Counselor's Role: 'Just Do It'"; (5) "School Climate: What's the Problem?"; (6) "Creating a Good School Climate"; and (7) "Creating Change: Some Things to Think About." A 5-item reference and sources section concludes the pamphlet. (EH)

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Whose Responsibility Is It?

The Role of Administrators and Counselors

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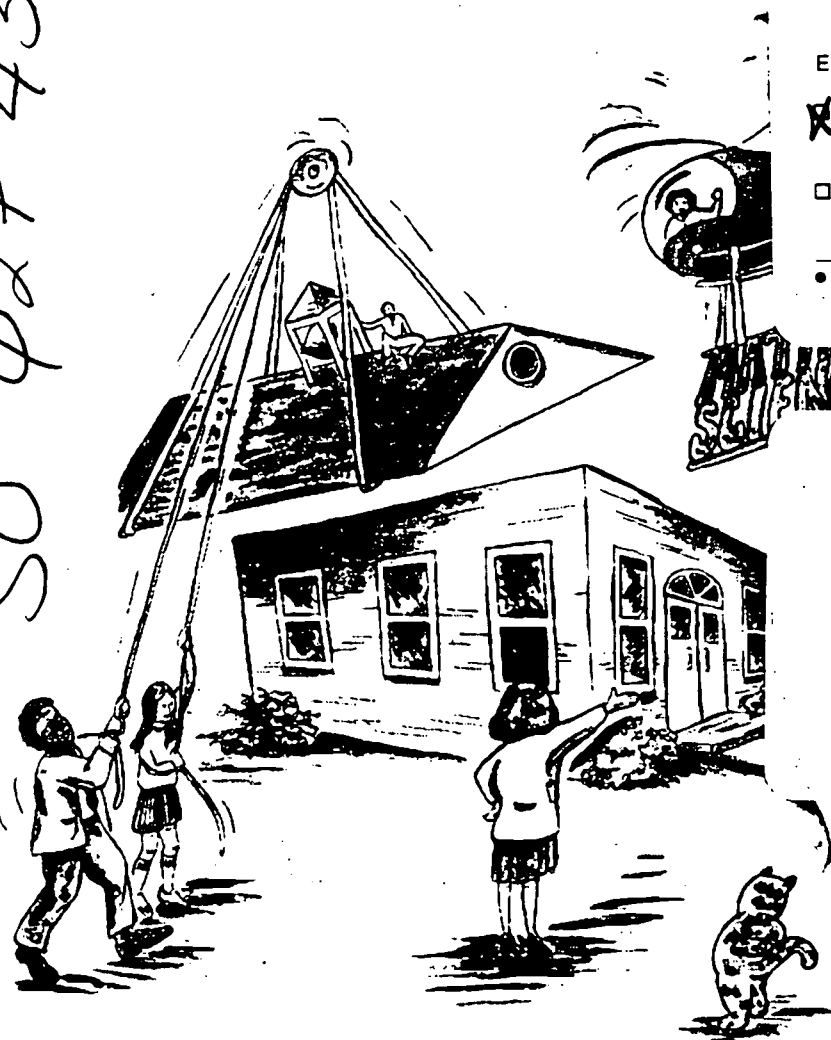
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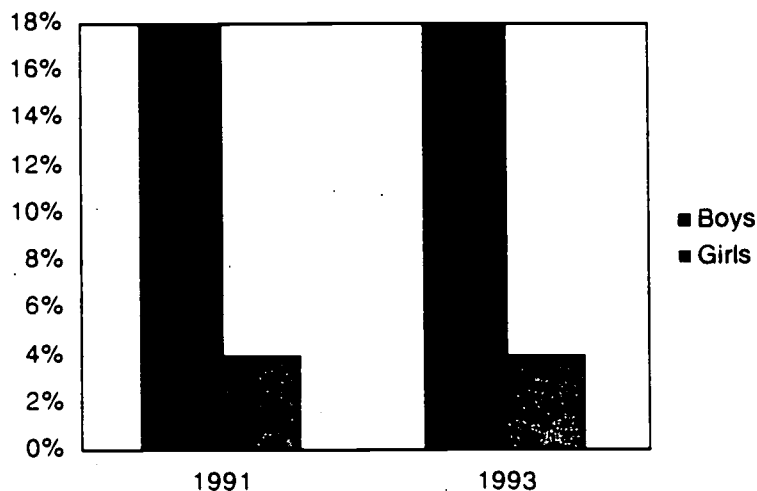
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Is There a Problem Nationally?

The National Science Foundation found that fewer female and male students are going into math- and science-related college majors, including engineering.

The problem is particularly serious for young women. In 1993, 18 percent of high school senior boys taking the SAT were interested in majoring in engineering, while only 4 percent of senior girls taking the SAT were! These percentages were the same in 1991.

College-Bound Students Interested in Engineering



In high school, girls are less apt to receive the academic preparation necessary for college study in math and the physical sciences. Girls and boys take algebra, geometry, third-year mathematics, and precalculus in equal numbers, but more boys take calculus. About the same number of high school girls and boys take biology and chemistry, but more boys take physics and more girls take advanced biology. High school girls are more apt than boys to report that they stopped taking math courses because they didn't like math and because they were advised not to continue in math. This was also true when students were asked why they didn't continue in science.

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Is There a Problem in Your School?

To find out, start by collecting current information.

Go back a year (or two) and look for patterns. If you can, collect information by gender, race, and people with disabilities.

To determine who is taking advanced math and science courses, you could use this table:

| Number of Students | African American | | Asian American | | Hispanic | | American Indian | | White | |
|----------------------|------------------|------|----------------|------|----------|------|-----------------|------|-------|------|
| | Girls | Boys | Girls | Boys | Girls | Boys | Girls | Boys | Girls | Boys |
| Total Enrollment | | | | | | | | | | |
| Math IV-Pre Calculus | | | | | | | | | | |
| Calculus | | | | | | | | | | |
| Physics | | | | | | | | | | |
| AP Physics | | | | | | | | | | |
| AP Chemistry | | | | | | | | | | |
| AP Biology | | | | | | | | | | |

Other questions to be answered could include the following:

- What is the selection process for admission to advanced math and science classes? Does it allow too few students in? Can students elect to take these courses or do they have to be selected?
- Who doesn't take math and/or science their senior year?
- Who drops out of math and science courses?
- What are the math and science grades and AP scores of girls and boys from different racial groups?
- How many girls and boys move "up a level" (i.e., from average to above average) in math and science courses each year? How many move "down a level" (i.e., from honors to above average)?

Determine if your school has a problem.

- Summarize the information you've collected and share it with counselors, teachers, interested students, parents, and community members.
- If there are problems with course enrollments, meet with others and see what might be behind these problems. It may be something that is relatively easy to address, such as scheduling or academic counseling, or it may be related to tougher issues such as school or classroom climate.

Develop some strategies to get more students—particularly girls—into advanced math and science courses.

The rest of this brochure has some ideas on where to start.

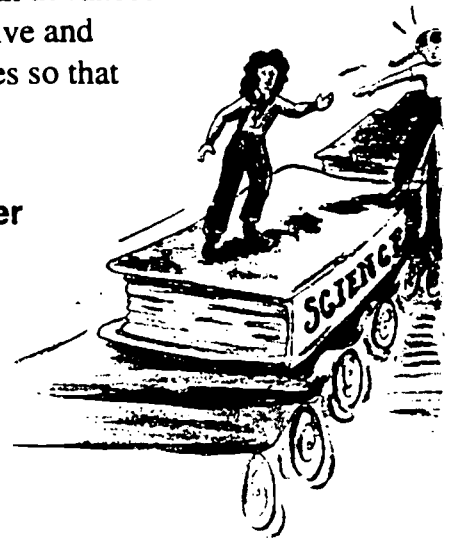
Scheduling: The Secret Weapon

Most schools find that they have fewer girls and students of color in advanced math and science classes, while some schools find that they have too few students overall in these classes. What can administrators do?

A wise principal noted, "Changing the teachers is hard; changing the rules is not as hard." Consider changing some of the "rules" to make it easier for all students to continue in math and science.

Don't make students choose between advanced math and science courses and popular electives.

If popular electives such as chorus or drama are in conflict with advanced math and science classes, too many girls will choose the elective and postpone or drop math and science. Schedule popular electives so that they don't conflict with upper-level math and science courses.



Reduce the negative consequences of trying a higher level of math or science.

Schedule courses so that if students elect a higher level math and science class, they can, if necessary, drop back a level without having to change all their other courses. Knowing that moving back a level won't wreak havoc on their lives can encourage more students to try.

Give students a second chance for the "fast track."

Many capable students are tracked out of advanced math as early as fifth and sixth grade. By establishing a two-year course beginning in 9th grade—where students take algebra, geometry, and algebra II—those students can get back on the high school calculus track.

Consider scheduling more advanced classes and fewer basic classes and see what happens.

Consider having all students take algebra. Remember when students take more upper-level classes, they will need support. You can have tutoring available throughout the school day, provided by National Honor Society or Math and Science Club students and teachers.

Develop science electives, such as Forensics and Marine Biology, that will draw additional students into the sciences.

Show appreciation to teachers who are successful in attracting and keeping both girls and boys in advanced classes.

Teacher rewards can include the "best" rooms and most convenient schedules.

The Counselor's Role: "Just Do It"

While most counselors *don't* actively discourage girls, many feel it isn't appropriate to "push" math and science on girls and worry about putting girls under too much academic pressure. Often counselors feel they must set girls up for academic success, not failure. While the motives are well-meaning, the results aren't. Too often this means that girls don't challenge themselves and don't go as far as they can. The problem is increased when there are not multiple "entry points" to advanced math and science and where there are negative stereotypes about students in different levels of math and science courses. It doesn't have to be this way. There are a number of things that counselors can do, including the following options.

Not worrying so much about students failing and worrying more about students not having the chance to succeed.

There is a need to balance the trauma of failing with the trauma of not trying and thus never succeeding.

Making continuing in math and science the "default option."

When a student comes in to schedule the next year's courses, assume they are going to continue in math and science. If they say no, ask why and try to talk them into continuing.

If students do well in a course, encourage them, particularly the girls, to move up a level next year.

Be aware of the differences across levels so you can explain what moving up a level would mean. Consider setting up informal meetings between students and the upper-level teachers to talk about the "pros and cons" of moving up.

Provide alternatives to moving down a level.

Find other alternatives to moving down such as tutoring or other kinds of extra help. If there is a reasonable chance that the student can make it at that level, she should stay there.

Remember students need to be encouraged.

Female engineering students report that the strongest encouragement for them in high school was teachers and parents saying "go for it," and "you're good, you can do it." Guidance counselors can play that role as well.

Watch out for your own stereotypes.

We all have stereotypes. Often our stereotypes focus on who does (and doesn't do) math and science or on how well individual girls will respond to the pressures of math and science. Asking others where they see our stereotypes may be painful but very helpful.



School Climate: What's the Problem?

When a group of high school girls was asked to describe the ideal school, they said:

School would be fun. Our teachers would be excited and lively, not bored. They would act caring and take time to understand how students feel. . . . Boys would treat us with respect . . . If they run by and grab your tits, they would get in trouble.

—The AAUW Report: *How Schools Shortchange Girls*

This was, for these girls, the ideal school climate. In most schools, even the best schools, the reality is far from the ideal. While sexual harassment is a major issue almost everywhere, there are a variety of other practices that need to be addressed as well, including

- the segregation of activities by gender, with most computer, math, and science clubs, teams, and other activities being “no woman’s land”
- “powder puff” football with male cheerleaders in drag
- gay baiting or bashing with terms such as *faggot*, *queer*, and *dyke* being used to intimidate students who don’t fit the stereotypes of what girls and boys should be and do
- expectations that lower-achieving students act out more



Who's Responsible?

It is quite clear who's responsible for classroom climate. It's the teacher. If someone in authority comes by and the class is out of control, the teacher is in trouble. If students can't learn in a classroom because of what goes on there, then the teacher *should* be in trouble. It is quite clear.

It is less clear who's responsible for the climate of the school. Ask who's responsible and you get a wide variety of answers—students, teachers, the administrators, even parents and the community. But if everyone is responsible, too often it means that no one is.

It's easier to have tunnel vision and hope and pray I won't see [problems outside of class time] because I don't want to deal with it.

—High school counselor

Everyone contributes to school climate and everyone has to “deal with it.” However there has to be a leader. That leader should be the principal.

Creating a Good School Climate

To create a good school climate there are a number of things you can do.

Acknowledge that administrators are key to creating a climate of academic excellence and respect for all students—girls and boys of every ethnic group.

Establish strong policies on nondiscrimination and sexual harassment. Set up procedures to collect data on enrollment, achievement, and level by gender, ethnicity, and ability to assess equity issues on an ongoing basis.

Define “a good school climate.”

Talk to others and see if your vision is shared by your faculty and staff. If not, work together to come up with a common definition.

Check out the current climate.

Ask faculty to observe how students treat each other and support staff. Ask students to observe how faculty treat each other and support staff. Ask the support staff as well. Have everyone check on harassment, civility, helpfulness, and respect. The results, without names, could be written up in the student newspaper and serve as a focus for discussion.

Check to see how teachers feel about intervening when students disrespect each other out of class.

If necessary, develop stronger policies and have workshops in which teachers can develop skills in diffusing conflict situations. Provide support and positive feedback when teachers “take appropriate action.”

Put equity on the teacher evaluation agenda and reward the more equitable teachers.

When classrooms are observed to determine how equitably teachers are treating their students check

- if girls and boys of different ethnic backgrounds and ability receive equally challenging questions
- if girls get to manipulate the equipment
- if girls and boys of different ethnic backgrounds and ability are respected and praised for academic behaviors when appropriate
- if teacher responses are condescending to girls

Look at the gender/ethnic distribution of teachers.

If the distributions are inequitable, see what can be done, over time, to make the teaching staff more diverse. Starting now, make sure that there are a wide variety of role models available to the students, including teachers with disabilities.

Creating Change: Some Things to Think About

Have a goal. An important goal is to “Reduce the gaps while all gain.” The gaps may be in enrollment, achievement, or even career choice. While in education our goal should be for all students to do better, for a school to move toward educational equity gaps related to characteristics such as gender and ethnicity must be reduced.

Remember that belief often follows practice. The Rand study of educational change stressed the importance of the initial commitment of those involved. Yet the ten-year follow-up found that most individuals who were required to change became believers.

The scope of the change is important. More ambitious efforts are more likely to stimulate teacher change and involvement than are narrow, modest projects.

Process counts. Some of the best predictors of successful change are

- the active commitment of district and site leadership
- the local selection of implementation strategies
- the adaptation of ideas and strategies for individual class and school use

The question, “What’s in it for me?” must be answered for each participant.

Individuals need to know

- the advantages of making the change
- how it fits with what is already there
- how hard it will be to make the change
- what will happen if it doesn’t work

References and Sources of Further Information

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Other brochures in this series include

“Girls Are . . . Boys Are . . . : Myths, Stereotypes, and Gender Differences”

“Teacher Strategies That Work for Girls and Boys”

“Why Me? Why My Classroom? Equity in Coed Math and Science Classes”

Illustrations by Judy Butler

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