

LETTERS

Educating Students to Appreciate Physics

After several years of decline, the number of physics BA degrees awarded by colleges and universities has leveled off (see PHYSICS TODAY, March 2000, page 68), and high-school enrollments are increasing somewhat. However, we can improve on these figures. My experience as a physics teacher suggests that it is the high-school course that generates the college and university enrollments in physics. In many US high schools, only the upper 20% or so of the student population takes physics. The rest are often excluded by either the unnecessary rigor of a course that emphasizes theory and questioning rather than tools and problem solving, or by poor performance on standardized tests. This exclusion leads directly to lower physics enrollments in higher education.

In some school districts—for example, New York City and Chicago—physics and chemistry are required high-school courses. Student populations in these urban schools are often considered to be at risk. However, I have taught in urban schools with mostly African American and Hispanic students, and my experience is that minority and other at-risk students can do well in a basic physics course with the standard mathematical components. Students need drills and practices so that, with individual help from the teacher, they can use a formula and solve for a variable, use scientific notation, take and analyze data, and understand how to do simple modeling.

In the past, high-school physics texts were badly written, often emphasizing “thinking,” while lacking problem-solving examples and the drills that might have helped inexperienced students. Almost any student can solve even a difficult and

advanced physics problem if an example is given or if the teacher provides individual help. Making students struggle with a problem without first giving them the basic tools to solve it discourages many who are capable and interested.

By making the high-school course more user-friendly and more applicable without sacrificing quality of content, we will generate more students taking physics at all levels of instruction. Motivated students will then encourage their friends to take physics. More teaching positions will result and fewer physicists will be lost to other professions.

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When Did the Science Wars Start?

In their book review “Bringing Reason and Context to the Science Wars” (PHYSICS TODAY, May 2001, page 57), Craig McConnell and Robert H. March stated: “By the 1990s, a number of scientists struck back, and the fat was in the fire.” The statement might be mistaken to mean that, before the 1990s, no scientists struck back, but that is not the case.

On 8 January 1988, Jon Turney, then science editor of the *London* (England) *Times Higher Education Supplement*, reported on page 2 the outcry over our *Nature* commentary “Where Science Has Gone Wrong.”¹ Turney wrote:

Teachers of history, philosophy and sociology of science . . . are up in arms over an attack by two Imperial College [London] physicists, . . . who charge that the plight of . . . science stems from wrong-headed theories of knowledge. . . . Scholars who hold that facts are theory-laden, and that experiments do not give a clear fix on reality, are denounced. . . . Staff on *Nature*, which published a cut-down version of the paper after the authors’ lengthy attempts to find an outlet for their views, say they cannot recall such a response from readers. “It really touched a nerve,” said

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