Speaking of Standards

Talk of standards is now the talk of the town.

The President's education initiative, expressed in *America 2000*, speaks of developing New World Standards for what students should learn in each of five core subjects — English, mathematics, science, history, and geography — and calls for the creation of American Achievement Tests tied to those standards and for the creation of New American Schools to meet them. And the publication of *Curriculum and Evaluation Standards for School Mathematics* by the National Council of Teachers of Mathematics (NCTM) has been very well received by both educators and mathematicians.

So a question one often hears today is, "Why don't we have standards for school science now?" But that bypasses more interesting and important issues:

What aspects of science education do fully spelled-out national standards make sense? Are there some aspects for which setting national standards is unnecessary or undesirable? What do we have now in the way of standards that educators, scientists, and the public should support? What is already in the works? How can standards best be expressed? Who will monitor national standards? How, and for what purposes?

A standard, in its broadest sense, is something against which other things can be compared for the purpose of determining accuracy, estimating quantity, or judging quality. In practice, they may take the form of *requirements* established by authority, *indicators* such as test scores, or *operating norms* approved of and fostered by a profession.

Project 2061 is engaged in a process leading to the formation of standards in several of these senses. Most important, in this regard, is *Science for All Americans* (*SFAA*). It *is* in fact a statement of standards — standards for what all students should know and be able to do in science by the time they finish school. These standards, developed over three years in a process involving hundreds of scientists and educators, are precisely the kind called for by the President.

The current debate bypasses many of the most crucial issues.

What is new and different about these science literacy standards is that they go substantially beyond what is expected of today's students. They demand that students come to understand science as a dynamic enterprise involving mathematics and technology as well as the natural and social sciences, that they are able to view the world through the eyes of science, and that they develop scientific habits of mind.

But *SFAA* presents only exit outcomes, and not, as in the case of the NCTM *Standards*, learning goals as children progress through the grades. Identifying those intermediate levels of understanding has been at the heart of our most recent work. During the last two years the six curriculum design teams, backed by university faculty, reformulated *SFAA* to express what they believe all students should have achieved by grades 2, 5, 8, and 12. They also produced examples of appropriate learning experiences and assessment methods.

A carefully selected representative task force will examine the recommendations of the six teams and draft a consensus document. This will then be revised in light of extensive review by many teachers, curriculum specialists, content supervisors, learning specialists, and scientists. The final consensus will be published in early 1992 as *Standards for Science Literacy* — national *norms* for what all students should know and be able to do at selected check points, along with sample *indicators* of progress.

That's just the start. The project also plans to identify standards of a different sort — actual curricula that best exemplify each of the models, and learning materials, assessment instruments, and teacher preparation programs that meet or surpass the specifications called for in the Blueprint reports and *Standards for Science Literacy*. ◪

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