Dear Maxine,

I heard a follow-up to the interview you did with Richard Harris on NPR recently: the caller said it was the "most cogent and understandable explanation of what science was all about that she had ever heard." I also thought you did a great job. Always good to get an attaboy!

You are right about universities having the option of accepting AP courses: Caltech requires freshmen to take calculus regardless of the number of high school AP calculus courses students have had. But I think this is a less productive approach, it would not be fair to many schools and their students, and politically, it is likely to backfire.

It is a rare AP biology course that skips evolution because the textbooks used are college level ones, which routinely include evolution. It isn't the AP courses we have to worry about, it's the regular courses which are not as demanding. And actually, because what a student learns depends on what the teacher teaches, and no one is looking over a teacher's shoulder, a student may not be taught evolution even in a district that *requires* it. Conversely, a teacher in a district not requiring evolution may indeed be teaching it. So there is an unfairness to both the responsible teacher and the student to make a blanket (and draconian) decision based on district or state standards. Refusing to let students claim AP biology credit at the college level because their *schools* don't require evolution would penalize many students who learned evolution and reward students who didn't!

There is also a "belling the cat" problem: how do you KNOW which districts require the teaching of evolution and which ones don't? (Aside from the problem of whether teachers actually taught or not). Would a department want to write to every school district of each student who applies for AP bio credit? Sounds like a nightmare for staff!
> The political repercussions also need to be considered. Already the >academic community is portrayed as (in Phil Johnson's terms) "cognitive >elites", who hold themselves above the hoi polloi, are arrogant >know-it-alls who are close-minded towards any suggestion that challenges >their accepted wisdom. Balderdash, of course, but why encourage it with a >gesture that the nonacademic public are likely to interpret as unfair (and >defensive)? Already a substantial part of the general public thinks that >"some scientists are brave enough to challenge evolution" and if the >"establishment" makes a pronouncement about denying AP credit from schools >not teaching evolution, this will merely reinforce the idea that we're >trying to stifle a legitimate academic dissention.
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>{And you KNOW how Americans love underdogs! Waving one's degree around >tends to get you nowhere with the American public. They want to know what >you SAY, not whether you have a degree from Harvard. In the past, pointing >out that particular creationists lacked legitimate degrees was not >especially effective in reducing their credibility. It was more like, "but >you haven't answered his argument!" And actually, the public is right about >this, but I digress.)
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>There *is* something that professional associations and science leaders can >do, but unfortunately it is much more difficult and time-consuming than >your suggestion. NAS, AAAS, and other organizations have to realize that if >they are going to make any difference in K-12, they have to be in it for >the long haul. As you said, there's a lot of talk, but we're not sure it's >getting us anywhere.
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>{What needs to be done is to improve science teachers knowledge of science >content information, and their understanding (in John Moore's phrase) >science as a way of knowing (SAAWOK). I appreciate what Leon Lederman is >doing in Chicago, but that it trying to curry the horse after it's already >run out of the barn. We have to get teachers *in training*, before they go >out to take their jobs, because in-service teacher education is mop-up at >best (though I spend a fair amount of time on it.) What needs to be done is: >
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>1) Work with science educators (the people who teach teachers) at teaching >colleges and other universities with education programs to "inspire" them >to beef up science content and stress the importance of evolution. There >are associations of science educators the members of which are not all dim >bulbs (though God knows a lot of them are, alas [not for attribution, >please...]) and some of them may be willing to take leadership roles in >beefing up graduation requirements for teachers. How many schools don't >require that teachers have majors in science to teach science? How many >education schools teach their own science classes, rather than requiring >students to get classes or majors in "real" science departments? Mr. >Rodney LeVake, currently suing his school district in Faribault, MN, over >his right to teach evolution and "evidence against evolution" has a degree >in "biology education", not biology. Can education schools be brought more
into the mainstream of scholarship?

2) Work with the state agencies that govern the educational requirements for teacher certification so that teachers are REQUIRED to have sufficient science and SAAWOK instruction that they are prepared to do a decent job. In many states, one can teach high school science without a major in the field. That's ridiculous. (A publishers representative in Texas once told me proudly that he knew all of his biology teachers by their first names. "Coach".)

There are other ways to get more science and SAAWOK (and evolution) into the system. Improve the tests.

3) Work with the people who write the SAT, ACT and any other "gateway" exams to be sure that evolution is a prominent theme in the exams, across the board from astronomy and geology to biology. Use the e-word prominently.

4) Work with the people around the country who write state "exit" exams for graduating seniors so that knowledge of evolution is required. Teachers teach to the test, and they are evaluated on how well their students do. It would be a foolish teacher who omitted evolution if she knew that students were going to have to know it to get a good grade on their exit exams. In Florida a few years ago they did it backward: the committee deciding the exit exam questions decided to drop evolution "because it wasn't fair to test students on something they weren't being taught." If that committee had been informed of how important evolution really is in science, they might have been less likely to make that decision.

5) Work with the people who prepare the tests that teachers have to take to insure that they know enough to teach science. The Education Trust recently issued a document analyzing these three kinds of tests. They did a good job, I think. The science content required for teacher certification, college admission, and high school exit is pretty dismal -- and evolution is not systematically included (though it is present in some.)

Improving science ed and the understanding of evolution this way I admit will be an exhausting task, full of potential disappointments (science educators are often a touchy lot who don't like "real" scientists telling them what to do, plus the politics between science educators and other educators in schools of education are just as bad as those among A&S departments) and one that will take years.

But this approach is the only one I can think of that is guaranteed to make a difference in science education. Teachers just flat don't know enough science or enough about SAAWOK. Evolution is just a piece of this bigger pie.

So that's my two cents worth. I'm off to Kansas for a lecture tour (should be a lot of fun -- part of my job is to encourage the discouraged faithful,
after all) and I won't be getting back to e-mail for a week. I'm more than
happy further to discuss these and other ideas with you in the weeks to
come. Might the NRC appoint a committee to investigate my five ideas and
others for long-term improvement of science education? Needless to say, I
greatly appreciate the "Teaching About Evolution and the Nature of Science"
and "Science and Creationism" efforts, but they will not produce systemic
changes, which is what is needed.

I'll be seeing Rodger Bybee this weekend (my last BSCS board meeting!) He
knows a LOT more about science educators and the requirements for teacher
certification and testing than I do.

Best,

Eugenie

(ps: while in Iowa this spring, I saw Stan Weinberg. It was sad: he has had
a stroke and his mind is a far cry from the Stan we knew of old. But he
knew me and took pride in NCSE, though he tended to repeat himself a lot.
He seemed happy.)

pps: I am taking the liberty of copying this to Herb Lin, who wrote me with
a similar proposal the other day.

At 09:00 PM 9/3/99 -0500, Maxine Singer wrote:

Greetings. As you may know, I have become peripherally involved in the mess
in Kansas. This came about partly because of the meeting I attended in DC
in July with three members of the Kansas State School Board, organized by
Jay Labov at the NRC. Then, I had an op-ed piece in the Wash Post on Aug
18. Nothing new in that that you could not, or would not have written
yourselves. I had an invitation to do it from Steve Rosenfeld, the person
who is acting head of the page since Meg Greenfield's death. Then, I
responded to a letter asking for nominations for a faculty position at
Kansas State that ironically arrived the day after the op-ed piece. I told
Professor Conrad that I would not consider nominating anyone because of the
situation etc. The op-ed and letter are being circulated in Kansas.
Anyway, all this put the situation to the front of my mind and I started
thinking what might be done besides talk, which seems to get no where. I
came up with the following idea.

University departments generally have full authority over their courses and
grading. The same seems to be true regarding acceptance of Advance
Placement status on the basis of AP biology exams given after completion of
high school AP courses. My idea is to try to put in place, in as many
universities as possible, nationwide, a policy that denies AP credits to
students whose high school biology curricula did not include a meaningful
treatment of evolution, regardless of AP scores. A student might actually
do pretty well in an AP exam even if she or he were unable to respond
correctly to questions about evolution. But lacking a good background in
evolution, one could make the case that the student is not adequately
prepared for advanced work in biology. Because Biology Departments should
be in a position to make such determinations independent of any
all-university committees, it might be politically feasible. I believe
that in other fields, some faculties have denied AP credit even given
decent exam scores, for example in mathematics.
Such a plan would probably have to be supported by the various societies,
who could then publicize the idea to members.
Universities that tried to prohibit such a plan would have to deal with the
issues around faculty governance of academic programs.
Thus, I think it could catch on and be effective. It would surely attract
attention, but being rather obscure, perhaps not too much. The point is to
get high schools to worry about their biology curricula by the inherent
pressure in such a University Biology Department policy.
I would very much like to know your reaction to this idea. The problems you
see in it. Whether you think it is feasible or worthwhile. I have suggested
to Professor Conrad at Kanasa State and he said he would try it out on
his colleagues.
thanks, Maxine
Maxine Singer (assistant: Sharon Bassin)
Carnegie Institution of Washington
1530 P Street, NW
Washington, DC 20005
Phone: 202 387-6404
Fax: 202 462-7395

Maxine C. Scott, Ph.D.
The National Center for Science Education, Inc.
925 Kearney St.
El Cerrito, CA 94530-2810
510-526-1674
FAX: 510-526-1675
800-290-6006
scott@natcenscied.org
web site: www.natcenscied.org