

PHYSICAL CHEMISTRY. THE NEXUS OF LETTERS

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Sequence of science in high school

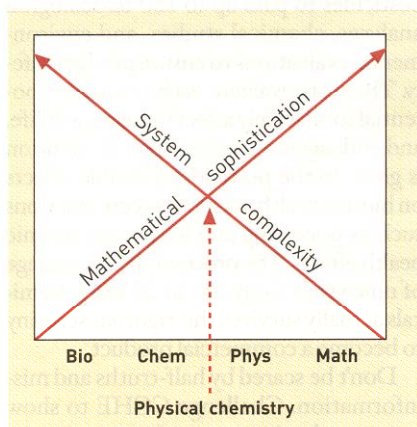
OVER THE PAST SEVERAL MONTHS, THERE has been commentary about the suggestion made (by a prominent particle physicist) that science education would be better served in high schools if the traditional sequence—first biology, then chemistry, and finally physics—were reversed. Of course that would have broad implications for science education generally.

A reporter for my local paper (in Oak Park, Ill., where I've lived for many years)—writing a piece about how that concept was being tested in our local high school—called me and asked for my opinion. I expressed the view that while reform is certainly called for, simply reversing the traditional sequence is not the way to go.

I have been quite visible in Oak Park, having brought computers into the local high school (and on to over 100 high schools in metro Chicago) in the early sixties as well as moving the College Board to create the AP/CS—the first exam was in May 1984.

In addition, I served for three successive terms on the ACS Committee on Professional Training that sets standards for bachelor degree programs in chemistry being followed by some 620 chemistry departments in the U.S.

Here is a display I have used in discussions about science education that may be of interest to those interested in the subject:



Note that the two lines indicating increase in mathematics sophistication moving

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from biology to mathematics and a mirror image representing system complexity cross between chemistry and physics—or physical chemistry.

This is not as arbitrary as one might first guess, for, in modeling the real world, we increasingly use molecular science whether we are describing individual molecules or assemblages of molecules as the basis for describing living matter or materials. And, increasingly, molecular-based modeling is done by applying physical chemistry. (I define physical chemistry for my students as application of the laws of physics using the language of mathematics to model bulk matter from a molecular perspective.)

Of course, computer-based modeling of molecules, with sophisticated graphics to represent both the structure of molecules as well as trends in properties—as still shots or in animation—has been a boon to teaching students about the properties of matter, living or not.

So my suggestion for reforming the teaching of the natural sciences is to begin with the concept of atoms—and assemblages of atoms as molecules—and to move on from there.

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