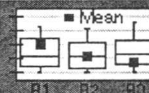


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Pictures of Life Using Web Images to Teach Biology

by Malcolm Campbell

(Posted April 1, 1999 · Issue 51)

Abstract

Web renditions of biological material are a boon to teacher and student, offering advantages such as three-dimensionality and motion.

This may be the best era in which to teach biology since Robert Hooke first observed cells through a microscope. Perhaps

Teachers have long recognized the importance of visual information when describing biological concepts.

more than any other scientific discipline, advances in biology have depended upon the visualization of processes and structures, such as the discovery of the Golgi body one hundred years ago, or the characterization of clathrin-coated pits. And teachers have long recognized the importance of visual information when describing biological concepts to students: we've used transparencies and slides in the classroom, and microscopes and dissections in the lab. Computers were a revolutionary new tool that teachers embraced. With the addition of the World Wide Web, educational resources increased exponentially, providing teachers with myriad new sources of information and new ways to help students comprehend biological processes.

Seeing Is Believing

Most students have trouble visualizing molecules as real, three-dimensional objects. To address this problem, I have used the huge searchable database of crystallographic structures and the data file that one can download from the [Structure Group](#) at the [National Center for Biotechnology Information](#). [RasMol](#) and [Cn3D](#) are freeware programs that convert a data file into a model that can be viewed from many angles ([figure 1](#)); one can rotate the molecule in space, and zoom in or out for different perspectives ([figure 2](#)). These programs are useful in demonstrating molecular processes such as protein-protein interaction, and since many of the molecules studied in the classroom have been crystallized, the instructor can choose which molecules to emphasize with computer graphics.

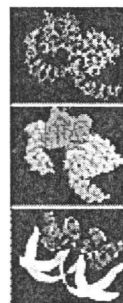
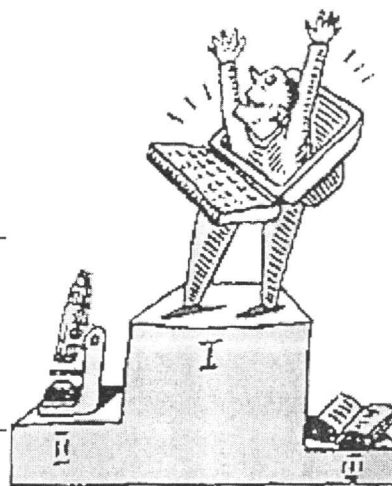


Figure 1

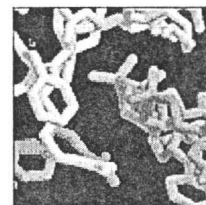


Figure 2

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Hooke.

A. Malcolm Campbell is an assistant professor of biology at Davidson College. He has made numerous presentations about teaching as an "alternative" career option, and has written How to Get a Teaching Job at a Primarily Undergraduate Institution.

Andrzej Krauze is an illustrator, poster maker, cartoonist, and painter who illustrates regularly for HMS Beagle, The Guardian, The Sunday Telegraph, Bookseller, and New Statesman.



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Endlinks

Beyond Bio 101: The Transformation of Undergraduate Biology Education - a report from the Howard Hughes Medical Institute includes an extensive collection of Web resources.

Cornell Theory Center Math/Science Gateway: Biology - links to resources in mathematics and science for educators and students in grades 9-12. Teachers of other levels may find these materials helpful.

The Biology Project - an online interactive resource for learning biology. From the University of Arizona.

Access Excellence - an excellent resource for biology teachers and students that contains online mysteries, interactive resources, lesson plans, and general information related to biology. Since the site is maintained by Genentech, it emphasizes genetics and biotechnology.

Biology Education Software Taskforce - publishes reviews of biology education software and provides links to software providers.

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