

EDUCATION

Worldly Analysis

High school students and undergraduates who work through the Earth Exploration Toolkit get the chance to crunch actual data from NASA, the U.S. Geological Survey, and other sources. Hosted by Carleton College in Northfield, Minnesota, the tool book features 13 chapters written by teachers and researchers that tackle timely earth science questions. Detailed instructions guide students through each procedure as they use satellite measurements to trace changes in the size of the Antarctic ozone hole, for example, or apply ocean buoy data to predict where phytoplankton blooms will erupt in the Gulf of Maine.

serc.carleton.edu/eet



RESOURCES

Puffballs and Morels And Rusts, Oh My!

You might find the gelatinous fungus known as witch's butter (*Dacrymyces palmatus*; left) protruding from cracks in the bark of pine trees. To learn more about the habitats, structure, and reproduction of witch's butter

and other fungi, dig into MykoWeb* from computer consultant Michael Wood of San Leandro, California. Aimed at researchers and amateur mushroom fans, the site reprints a classic mycology text and features articles from experts on topics such as the latest taxonomy and the biology of mycorrhizae, the partnerships between plant roots and fungi. But the centerpiece of MykoWeb is California Fungi, a photo-packed guide to more than 400 of the state's species, including *D. palmatus*.

To check on species that dwell farther north, visit The Pacific Northwest Fungi Database† from Washington State University in Pullman. The growing site catalogs some 5000 types of fungi. Listings include the species' classification, who first described it, and the original reference.

* www.mykoweb.com

† pnwfungi.wsu.edu/programs/aboutDatabase.asp

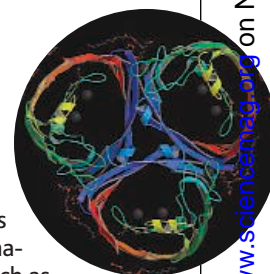
DATABASE

Proteins on the Edge

Membrane proteins connect cells to their environment, shuttling materials in and out and picking up communiqués from other cells. At this new clearinghouse run by structural biologist Martin Caffrey of Ohio State University in Columbus and colleagues,

you can get the lowdown on more than 140 of these proteins, which are embedded in membranes or positioned near them. The site's profiles summarize information gleaned from other collections such as the Protein Data Bank and from the literature. Pick a molecule such as porin (right), which allows bacteria to sop up ions and nutrients, to uncover structural details such as how many times it winds through the membrane (16) and whether it harbors any metals or other nonprotein components (no). The entries also summarize how researchers crystallized the protein and determined its architecture.

www.lipidat.chemistry.ohio-state.edu/MPDB/index.asp



IMAGES

Molecules in Motion

A transfer RNA molecule hands off its amino acid to a growing peptide strand dangling from another transfer RNA (below). The relay is a key maneuver in protein synthesis, or translation. High school and college students can follow the steps of translation or zoom in on other biological processes at the Virtual Cell Animation Collection from North Dakota State University in Fargo. Playing at the site are eight narrated animations that show how protons trickling through the mitochondrial membrane power ATP synthesis, for example, and illustrate which segments get chopped out during mRNA splicing. Beginners who only need an overview of the action can click through the stills in the "First Look" sections. The "Advanced Look" options provide more details for upper-division college or grad students.

vcell.ndsu.nodak.edu/animations



TOOLS

The Biomedical Literary Companion

You've found a PubMed abstract for a paper by A. Chen and want to track down other publications by the same author. You could try winnowing the more than 1500 hits on that name, or you could click over to the Arrowsmith Project Web site from neuroscientist Neil Smalheiser of the University of Illinois, Chicago, and colleagues. The project's "Author-ity" tool weighs criteria such as researcher affiliation, co-author names, journal title, and medical subject headings to identify the papers most likely written by your chosen scientist. The site offers other helpers for squeezing information out of PubMed results, such as the Arrowsmith feature, which pinpoints common terms in two lists of search results.

arrowsmith.psych.uic.edu/arrowsmith_uic/index.html

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