

SimUText Ecology (SimBiotic Software for Teaching and Research; <http://simbio.com/products-college/simutext-ecology>)

The SimUText Ecology package is a fully online replacement for a traditional ecology text. SimBio Software's ecology modules provide an innovative and engaging way to incorporate student-centered, inquiry learning into ecology or environmental science units. The modules include lab simulation activities and interactive e-text chapters that focus on specific concepts. The simulations combine an intuitive user interface with informative sidebars containing facts about the species involved, and a lab worksheet guides students through each activity.

The simulations are inquiry-based in that they prompt students to test their own preconceptions. For example, in the Isle Royale simulation, students are asked to predict whether increasing the food supply will help stabilize the fluctuations of the moose population; then, after running the simulation, they must compare their prediction with the output of the model. (The answer: more food actually results in larger booms and busts.)

Another excellent simulation is based on Robert Paine's work demonstrating that the sea star *Pisaster ochraceus* acts as a keystone predator in intertidal communities. Students are first presented with a bar graph of relative species abundance and picture of the community as a whole, and must make observations (i.e., by examining stomach contents) and determine the community's food web. Next, students are asked to predict the results of removing each of the various species (mussels, coral, sea stars, etc.) from the ecosystem. Because the sea star is the least numerous species, students may be surprised to learn that its removal causes a dramatic decline in species richness as the mussels it had preyed on take over the ocean floor.

Lab activities cover concepts including predator-prey dynamics, carrying capacity, resource partitioning, the competitive exclusion principle, keystone species, food webs, limiting nutrients, and succession. The

inquiry-based design of each simulated lab activity has a nice flow to it, and each exercise is part of a logical progression that has students propose and test hypotheses, eventually arriving at some key concept in ecology.

The SimUText chapters are visually appealing and easy to navigate, and the modules contain animations, mini-activities, key terms that hyperlink to glossary definitions, and review questions that can be submitted to the instructor. The chapters are highly interactive and engaging while avoiding distractions like irritating sound effects and glitz for its own sake. Case studies are used effectively throughout; for example, the community dynamics chapter draws its examples from Yellowstone National Park, where students investigate the effects of introduced lake trout, the recent decline of the aspen population, the reintroduction of wolves, and the park's fire management policy. Students have many opportunities to practice essential skills like making predictions, testing hypotheses, and describing and interpreting graphs.

The chapters are most appropriate for an AP Biology or college course, but the lab modules are readily adaptable for general biology students. The simulations could work for a range of course levels – college and AP students, for example, can perform a t-test to analyze their Isle Royale data, while high school general biology students can focus on the basics. A built-in quiz at the end of each module makes assessment a snap. AP- or college-level biology or environmental science teachers should consider using SimBio's modules to supplement curriculum, to replace lectures, or even to provide students with independent or distance learning opportunities.

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Caterpillar to Butterfly: Adventures in Science, Music and Dance (DVD, 80 min.; Missarmia Productions, <http://www.marciadaft.com>)

Marcia Daft, a nationally known arts integration specialist, professional musician, and teaching artist, has produced "Caterpillar to Butterfly," intended for students in kindergarten through third grade. This interactive learning experience comprises a series of lesson plans: students study the life cycle of the monarch butterfly through viewing time-elapsed nature footage, move their bodies to specific musical accompaniment to demonstrate metamorphosis, retell their understanding in their own words and drawings, and perform the butterfly life cycle.

The DVD is divided into six sections that include an explanation of arts integration practice, directions for facilitating the lessons, rules for music and movement, sections for direct student learning, and the complete musical score with directions for a culminating student performance. Lessons for children contain clear visual and oral directions, are paced appropriately, and are highly engaging and interactive. After viewing nature footage of the metamorphosis of a monarch butterfly, students are invited to move to demonstrate the changes a butterfly undergoes, cued by an original score composed by Ms. Daft that reflects the actions of the organism. The DVD jacket gives a brief description of the chapters and also lists the National Content Standards covered in Science, Dance, and Music.

Caterpillar to Butterfly is beautifully photographed, easy to use, highly engaging, interactive, and scientifically accurate. A perfect complement to a classroom textbook or hands-on learning experience, it can also be used as a primary teaching tool with assessment of student understanding built in. Children are asked to demonstrate understanding of the life cycle through oral descriptions, illustrations, and group and individual creative movement and musical experience. As a multisensory, interactive, group experience, this program has the capacity to reach all students, including non-English speakers, challenged learners, and those needing additional enrichment.