

BIOLOGY IN A BOX PROJECT OVERVIEW

What is *Biology in a Box*?

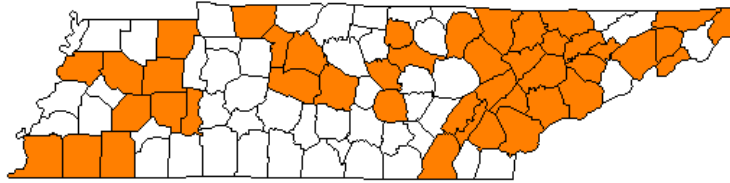
- *Biology in a Box* is a fun and challenging way for entire schools to enhance their life sciences curriculum at all grade levels, and to encourage student interest in STEM (science, technology, engineering, and mathematics) disciplines. The program employs a hands-on, inquiry-based approach to teach the wonders of the living world, as well as introducing the scientific methods and math skills we use to understand that world.
- Each thematic unit has exercises that are designed to enrich science curriculum content for students from the elementary grades through high school, with exercises often having separate versions for both lower and higher grades, though most exercises are easily tailored to fit any grade level. The goal of each unit is to pique the interest of even low-ability students on a particular biological theme. The more advanced activities in a thematic unit, furthermore, have been designed as curriculum enrichment for very bright students who need a challenge.
- The *Biology in a Box* program is especially valuable to teachers in schools that have limited resources for extra materials. The materials needed for completion of the exercises, presented in each thematic trunk, are totally reusable and are generally not commercially available. It is also an excellent program for schools with a limited science faculty, since no prior knowledge of the subject matter is needed for a teacher to explore a box theme with his or her students.
- We are presently limited to serving counties in Tennessee (teachers can check the partnership page to see if their school system is enrolled in the project). Anyone can access the ideas, exercises, and concepts on our website, however.

History

- Professor Susan Riechert, from the Division of Biology in UT's Department of Ecology & Evolutionary Biology, developed *Biology in a Box* in 1993 as a science education outreach project. She recognized the need for supplementary science resources in East Tennessee schools, and saw *Biology in a Box* as an effective means of meeting that need.
- At the program's outset, the boxes were circulated only in the Knox County school system. Since then, the project has expanded to currently serve over hundreds of thousands of students in over 70 school systems throughout the state, with a goal of provisioning the entire state. In addition, the materials are now available to a global audience through the newly-updated website. A recent partnership with the National Institute for Mathematical and Biological Synthesis (NIMBioS) has resulted in exciting additions to existing learning units, incorporating even more mathematics (further enhancing the integrative STEM approach of the program) at all grade levels, and further revisions, as well as additional new learning units are in the works!

Currently Available Units & Topics Covered	
Unit	Topics Covered
Unit 1: Fossils	The fossil record, identification of fossils, fossil dating methods, change in organisms over time
Unit 2: Of Skulls & Teeth	Functional anatomy, the skeletal system, diet types, adaptation
Unit 3: Fur, Feathers, Scales: Insulation	Insulating mechanisms of various organisms (mammals, birds, and reptiles), thermodynamics
Unit 4: Simple Measures	Physical properties of objects (mass, volume, density, etc.), Newtonian physics
Unit 5: It's In Your Genes	DNA, Mendelian genetics, mechanisms of inheritance, probability, interaction between genes
Unit 6: Animal Kingdom	Biodiversity, taxonomy (classification) of organisms, relationships between groups of organisms
Unit 7: Backyard Naturalist	A closer look at organisms of Tennessee, learning to identify animal signs such as scats, tracks, bird songs, etc.
Unit 8: Everything Varies	Variability in the natural world, basic statistics (such as the mean, median, mode, standard deviation, and variance), comparing populations
Unit 9: Forestry	The trees of Tennessee, and their wildlife and economic importance
Unit 10: Behavior	Animal behavior, sensory capabilities, the scientific method, mimicry and protective coloration, animal communication, analyzing behavior, learning and memory, environmental stimuli and behavioral responses
Forthcoming Units: Cells & Cell Processes From Climate to Habitats Growth, Size, & Life Cycles	

Participating Counties in Tennessee (as of January 2010)



Additional school systems served

- Alcoa City
- Bradford SSD
- Bristol City
- Catholic Diocese of Memphis (serving Bartlett area)
- Central Elementary
- Clarksville City
- Clinton City
- Collierville Elementary
- Collierville Middle
- Collierville High
- E.A. Harrold
- Ellendale Elementary
- Fayette Academy
- Harriman City
- Humbolt City SSD
- Johnson City
- Kingsport City
- Kingston City
- Lenoir City
- Lexington City
- Maryville City
- Milan SSD
- Oak Ridge City
- Sweetwater City
- Tennessee School for the Deaf
- Trenton SSD
- Rutledge City
- Washington County University School (also serving Gray Fossil Site Museum)
- Washburn City

What does it mean to be a participating school system?

- Each school system receives at least 1 set of thematic units consisting of reusable materials & exercises housed in wooden trunks.
- A 'Box Keeper' in each system is identified that keeps track of where the units are, arranges pick up/delivery to teachers requesting them, and reports breakage and loss of materials needing replacement.
- Funds permitting, participating school systems:
 1. Receive regular upgrades of new exercises and themes, revised State science and math standards for each exercise, and suggested readings and links for each unit.
 2. Are offered teacher training in the role of community learning, where the teacher acts as facilitator of student exploration.

The *Biology in a Box* program works!

- In class TCAP performance data from Knox County schools, all teachers showed improvement in their students' science test scores.
- Increases across individual classes ranged from 2-12% better than their classes' performance compared to a year prior to teacher participation in a *Biology in a Box* Summer Institute.
- The positive change in student test performance for grade level implementation* of *Biology in a Box* exercises in schools following a teacher's participation in the project's Summer Institute was markedly higher than the State average of +0.9 for 2006, with five reporting school systems showing increases of +2.8, +4.3, +5.2, +7.9 and + 8.3.

* Grade level implementation of the project occurs when a teacher participating in a *Biology in a Box* workshop transfers the experience to fellow teachers in her/his school.)

Contact Information for Project Director

Dr. Susan E. Riechert

email: sriecher@utk.edu

Telephone: (865) 974-6187, 974 6041, 974-2371

Fax: (865) 974-3067

Mailing Address: Division of Biology, University of Tennessee, 569 Dabney Hall, 1416 Circle Drive, Knoxville TN 37996-1610

Further information regarding our program can also be found on our website, at <http://eeb.bio.utk.edu/biologvinbox>

There, you can find the content of all of our current learning units, how to become an extended part of our team by becoming a Box Keeper, contact information for the rest of our team, and much more!