

THE AMERICAN BIOLOGY TEACHER



About Our Cover

The golden tree snake (*Chrysopelea ornata*) of Southeast Asia is a member of the largest family of snakes, the rear-fanged Colubridae. *Chrysopelea* is unique in its ability to glide, which is why it is often called the flying tree snake. This gliding ability provides the appearance of effortless movement from tree to tree, with fast motions and the ability to climb vertically using keeled or ridged ventral scales called gastrosteges that help with grip. Contraction of its belly surface forms a concave depression along the snake's body length, mimicking a parachute by increasing air resistance when the snake launches itself to the ground. S-shaped undulations and tail movements provide stability while in the air.

The attractive striping pattern of the golden tree snake makes it desirable for captivity displays, increasing its involvement in the exotic pet trade. However, these snakes are skittish in temperament, and breeding in captivity is difficult.

Ubiquitous in Thailand, these mildly venomous beauties eat anything from geckos and insects to small rodents. Photographer Jeremiah Boulware happened to come across this particular golden tree snake under a bridge in the suburbs of Bangkok, feasting on an unidentified species of bat.

Contents

Feature Article

The Fascinating & Controversial New Science of CRISPR

Providing science educators a broad and up-to-date overview of a powerful biotechnology tool

David Wollert

Available online at <https://www.nabt.org/ABT-Online-Current-Issue> 279

When ANOVA Isn't Ideal: Analyzing Ordinal Data from Practical Work in Biology

Using online freeware suitable for classroom settings to apply a rank-based approach to analyzing ordinal data

Michael Calver, Douglas Fletcher

RECOMMENDED
FOR AP Biology

289

Research on Learning

Undergraduate Textbook Representations of Meiosis Neglect Essential Elements

Examining the need for resources that support teaching meiosis beyond the chromosomal level of DNA

L. Kate Wright, Grace Elizabeth C. Dy, Dina L. Newman

296

An Analysis of Students' Makeup-Exam Results and Performance in Undergraduate Biology Courses

Evaluating whether students taking makeup exams are gaining a significant advantage over their peers

Dennis D. Tarasi

308

Inquiry & Investigation

Wet & Dry Lab Activities to Introduce Students to CRISPR-Based Gene Editing

Using a student handout and instructor guidelines to introduce CRISPR-Cas9 in the high school and undergraduate classroom

David Wollert

315

Taking a Shot for the Team: Using a Simulation to Explore How Immunization Programs Help Protect Communities from Infectious Diseases

Helping students understand and retain larger-scale principles of controlling the spread of infectious disease

Darrell L. Ray

323

Learning Inquiry by Applying the Principles of Fermentation to the Production of Yogurt

Teaching hypothesis formulation, experimental design, and hypothesis testing through an exercise showing how empirically derived knowledge can be applied to the design of a food product

Tahl Zimmerman, Tim Goetz, Salam A. Ibrahim

328

Exploratory Activities for Understanding Evolutionary Relationships Depicted by Phylogenetic Trees: United but Diverse

Engaging students in the process of science through a series of student-centered activities that help students develop their tree-thinking skills

Erin McCullough, Laren Verdeflor, Alaina Weinsztok, Jason Wiles, Steve Dorus

333

Tips, Tricks & Techniques

Role-Playing Activity to Demonstrate the Electron Transport Chain

Helping introductory biology students learn the role of the electron transport chain in the synthesis of ATP

Elizabeth Harrison

338

A Water Balloon Eye Model for Teaching about the Human Eye

Using a self-made, inexpensive, functional eye model to show how an image is formed in the eye, and to teach about the vitreous humor, the shape of the eyeball, shortsightedness, farsightedness, accommodation, and glaucoma

Kwok-chi Lau

341

Incorporating Writing into College Biology Using Student-Created Open Educational Resources

Creating a collaborative English and biology course in which students practice writing and composition skills while designing textbook materials for their biology course content

Lindsey K. Roper, John Belk, Rebekah Smith

344

Guided Journaling: Focused Writing to Enhance Learning during a STEM Short-Term Study Abroad Course

Enhancing student learning by using a beneficial tool for experiential teaching situations such as internships, practicums, co-ops, field trips, laboratory activities, and community-based learning

Darlene Panvini

348

Departments

Guest Commentary • Committed Citizens Can Change the World & Help Teach Citizenship • Tanya Quiroz,

Cheri W. Tisdale

277

The ABT BioMystery

278

Book Reviews • Amanda L. Glaze-Crampes, Department Editor

357

Classroom Materials & Media Reviews • Jeffrey D. Sack, Department Editor

361

Sacred Bovines • Role Models & Real People • Douglas Allchin

364

In our April 2020 issue, we incorrectly spelled the last name of author Kristy Daniel in the Table of Contents. We apologize for this error.