

# THE AMERICAN BIOLOGY TEACHER



## About Our Cover

These young white-faced capuchin monkeys, *Cebus capucinus*, are a common sight for sharp-eyed tourists in Central America. This pair was relaxing at the forest edge of Manuel Antonio National Park on Costa Rica's central Pacific coast. Of Costa Rica's four native species of monkeys, capuchins are the most easily habituated to humans. Some North Americans may still remember this species as the "organ grinder's monkey" from times gone by. Their expression and curiosity are captivating, but active capuchin monkeys have needs that home captivity can rarely provide. Ownership of monkeys as pets is not supported by reputable animal-care organizations.

Early explorers of Central America found the color patterns of these primates reminiscent of the robes of 15th-century Franciscan monks and named the abundant monkeys after the Order of Friars of Minor Capuchin. Species-level taxonomy is still being examined, but the genus name, *Cebus*, is derived from the Greek word *kēbos*, meaning a long-tailed monkey.

Capuchins move rapidly through a range of forest types as they search for a varied diet of fruits, invertebrates, small mammals, and the occasional sandwich pilfered from unsuspecting tourists. They are increasingly recognized as crucial seed dispersers in rainforest ecosystems, especially for tree species of the high canopy. Population stability of all New World monkeys is concerning, and although white-faced capuchins are regarded as of "least concern" by conservation agencies, deforestation and the pet trade take a heavy toll.

The photo was taken by Darrell Vodopich (Biologyimaging.com) using a Canon 7D II, Canon 400 mm at ISO 800, F5.6, 1/160 sec.

## Contents

### Feature Articles

- Vertical Alignment of Educational Opportunities for STEM Learners: Evaluating the Effects of Road Dust on Biological Systems**  
*Exposing future STEM workers (HS students and college undergraduates) to meaningful research experiences*  
Jason A. Rosenzweig, Daniel Vranceanu, Hyun-Min Hwang, Shishir Shishodia ..... 710
- A Survey of Practical Experiences & Co-Curricular Activities to Support Undergraduate Biology Education**  
*Active learning experiences are highly valued components of preparing undergraduates to become biologists*  
Lauren E. Parker, Sara R. Morris ..... 719
- Ten Tweaks That Can Improve Your Teaching**  
*Ten teaching techniques that are easily implemented and result in increasing student engagement & learning.*  
Jay Phelan ..... 725  
Available online at ..... <http://www.nabt.org/websites/institution/index.php?p=762>

### Research on Learning

- Using a Problem-Based Learning Approach to Teach Students about Biodiversity, Species Distributions & the Impact of Habitat Loss**  
*Improving student scientific literacy by using a multifaceted approach that integrates background readings, hands-on activities & data analysis/synthesis*  
Matthew J. Heard ..... 733

### Inquiry & Investigation

- Wastewater Treatment Provides for Authentic Inquiry-Based Experiences in the Lab and Beyond**  
*Introducing students to bioremediation, microbiology & metabolism while learning about water use and conservation*  
Matthew Fisher ..... 739
- The Bio Bay Game: Three-Dimensional Learning of Biomagnification**  
*Teaching students about the biomagnification of toxicants across trophic levels while engaging them in 3-D learning*  
Chandana Jasti, Hillary Lauren, Robert C. Wallon, Barbara Hug ..... 748
- Integrating the Dimensions of NGSS within a Collaborative Board Game about Honey Bees**  
*"Swarm! The Honey Bee Game" allows students to manipulate a model of various influences on bee behavior and the resulting impact on colony growth*  
Hillary Lauren, Claudia Lutz, Robert C. Wallon, Barbara Hug ..... 755
- Analyzing *Tetrahymena* Movement with an Inexpensive & Engaging Inquiry Lab**  
**Tetrahymena* are an excellent model organism for teaching basic scientific research skills*  
Chris Stewart, John Giannini ..... 764



### Tips, Tricks & Techniques

- Fostering Learning in Microbiology with a Unique Awards System**  
*Introducing the "Gold, Silver, and Bronze Petri Dish Awards in Microbiology"*  
Javier Gutiérrez-Jiménez, Lorena M. Luna-Cazares, Jorge E. Vidal ..... 772
- Teaching Cell Biology through Stories: Marvels of the (Squabbling) Cell**  
*Using analogy-integrated stories to render key concepts and information accessible & engaging to students*  
Michael Parker ..... 774
- Microbial Community-Level Physiological Profiling as an Inquiry Laboratory Exercise**  
*Using EcoPlates to help students develop experimental design & data analysis skills*  
Pamela A. Marshall ..... 776



### Departments

- From the Editor** • *The Next Generation Science Standards: How Many Dimensions of Learning Are There?* • William F McComas ..... 707
- Book Reviews** • Elizabeth Cowles, Department Editor ..... 780
- Classroom Materials & Media Reviews** • Remy Dou, Department Editor ..... 783
- 2016 Index for Volume 78 of The American Biology Teacher** ..... 785
- Index to Advertisers** ..... 790