

# THE AMERICAN BIOLOGY TEACHER



## About Our Cover

A Spring Peeper (*Pseudacris crucifer*) finds shelter in the flower of a Jack-in-the-Pulpit plant, *Arisaema triphyllum*. This photo was taken at Kessler Mountain Nature Preserve, an urban greenway in Fayetteville, Arkansas.

The Spring Peeper is a common amphibian in central and eastern Canada and the United States. They are primarily active in spring, as the name suggests, and as early spring rains begin to warm the cold earth, their calls become an extremely common sound. During these rains, adults seek out woodland ponds where they congregate in large numbers to breed. Peepers are loud, but their "big" voice can fool a listener, as this frog barely reaches more than an inch in length. Spring Peepers may be a variety of grays, browns, and greens, with a telltale "X" marking on their back. After breeding, they retreat into the forest where they spend the remainder of the year.

This particular peeper was found in late spring, after the masses at breeding ponds dispersed. It sought shelter inside a Jack-in-the-Pulpit plant, where a small amount of water had accumulated. Jack-in-the-Pulpit is a perennial plant, blooming during the months of April and May. The tiny flowers form along a spike (Jack) surrounded by a colorful, hooded sheath (the pulpit), which can be green, dark purple, or a combination of the two. Male flowers form first, those along the lower part of the spike, becoming hermaphroditic as they age. By late summer, the hermaphroditic flowers produce red berries that grow in a cluster. This plant grows to be 1 to 2 feet tall and is found in moist, shaded forests throughout eastern North America, where it is a native.

The camera settings for this photo were 1/200 at f/16, 300mm, ISO 640. The photographer is Mitchell Pruitt, a graduate student in conservation biology at the University of Arkansas, mlpruitt24@yahoo.com.

## Contents

### Feature Articles

#### New Approaches in Cancer Biology Can Inform the Biology Curriculum

*Teaching of basic biological concepts and to connect biology and biomedical research*

Lynda Jones, Diana Gordon, Mary Zelinski ..... 168  
Available online at ..... <https://www.nabt.org/ABT-Online-Current-Issue>

#### The Use of Puppetry and Drama in the Biology Classroom

*Using puppetry as pedagogy within a problem-based and cooperative learning setting*

Josef de Beer, Neal Petersen, Sanette Brits ..... 175

#### The Fight to Keep Evolution Out of Schools: The Law and Classroom Instruction\*

Gordon Emmett Hall, Shirley Andrea Woika ..... 235

### Research on Learning

#### Effects of Hierarchical Mentoring on Freshman Retention in a Biology First-Year Experience Course

*How the design of BioSkills supports and educates future biology professionals*

Peter Cavnar, Claudia Stanny ..... 184

#### The Impact of Using Geographic Information Systems Technology on Students' Understanding of Epidemiology

*Using GIST infusion to improve students' understanding of epidemiology & disease spread*

Jason A. Rosenzweig, Maruthi Sridhar Balaji Bhaskar, Shishir Shishodia ..... 191

### Inquiry & Investigations

#### An Inexpensive and Convenient Method to Culture Facultative Anaerobic Microorganisms from Yogurt

*Teaching students to culture and visually identify facultative anaerobic bacteria*

Mandy Weaver, Megan Delaney, Jennifer R. Zitzner, Domenic Castignetti ..... 198



#### Patterns vs. Causes and Surveys vs. Experiments: Teaching Scientific Thinking

*A conceptual framework that distinguishes the fundamental concepts of pattern & cause*

Russell C. Wyeth, Marjorie J. Wonham ..... 203

#### Modeling the Emergence of Antibiotic Resistance in Bacterial Populations

*Exploring how a population of bacteria can evolve antibiotic resistance, with emphasis on dispelling common misconceptions about antibiotic resistance*

Michelle A. Williams, Patricia J. Friedrichsen, Troy D. Sadler, Pamela J. B. Brown ..... 214



#### Use of Crime Scene Investigations in Anatomy and Physiology: Potential for Going Beyond Knowing in NGSS Dimensions

*Encouraging students to examine evidence even as they learn specific biology concepts can encourage meaning making about scientific practices and science content*

Catherine L. Quinlan ..... 221

### Tips, Tricks & Techniques

#### Helping Students SOAR: Quizfolio Tips to Engage First-Generation, Under-Represented Minority Undergraduates in Scientific Inquiry

*An active learning space for students to integrate student-centered in-class discussions & lab inquiries in a first-year undergraduate biology course*

Robert M. Kao ..... 228

### Departments

**Guest Editorial** • *Skin Color and the Nature of Science* • Douglas Allchin ..... 163

**Editorial** • *Thank You, ABT Publication Team Members* • William F. McComas, Editor-in-Chief ..... 165

**Book Reviews** • Amanda L. Glaze, Department Editor ..... 242

**Classroom Materials & Media Reviews** • Remy Dou, Department Editor ..... 248

\*Due to a production error, a draft version of the article entitled "The Ongoing Challenges to Evolution Education: Schools, the Law, and Classroom Instruction" was published in Volume 80 Issue 2 of *The American Biology Teacher*. The edited and approved version of the article has been included in this issue of the journal. We apologize to the authors for this mistake and to our readers for any inconvenience this reprint may have caused.