

Table of Contents

EDITORIAL UPDATE

Next Steps for *Vision and Change*: Moving from Setting the Vision to Change
 Erin L. Dolan 201–202

LETTER TO THE EDITOR

Integrating Genomics Research throughout the Undergraduate Curriculum: A Collection of Inquiry-Based Genomics Lab Modules
 Lois M. Banta, Erica J. Crespi, Ross H. Nehm, Jodi A. Schwarz, Susan Singer, Cathryn A. Manduca, Eliot C. Bush, Elizabeth Collins, Cara M. Constance, Derek Dean, David Esteban, Sean Fox, John McDaris, Carol Ann Paul, Ginny Quinan, Kathleen M. Raley-Susman, Marc L. Smith, Christopher S. Wallace, Ginger S. Withers, and Lynn Caporale 203–208

FEATURES

Approaches to Biology Teaching and Learning
Common Origins of Diverse Misconceptions: Cognitive Principles and the Development of Biology Thinking
 John D. Coley and Kimberly D. Tanner 209–215

From the National Science Foundation
Teacher Preparation: One Key to Unlocking the Gate to STEM Literacy
 Mary Lee S. Ledbetter 216–220

Current Insights
Recent Research in Science Teaching and Learning
 Deborah Allen 221–225

WWW.Life Sciences Education
Cell Biology Apps for Apple Devices
 Louisa A. Stark 226–230

Book Review
The Rubrics Game
 José Vázquez 231–232

Book Review
Teaching Skeptical Inquiry
 Marshall D. Sundberg 233–234

Book Review
Back to the Evolutionary Future
 José Vázquez 235–236

Book Review
Teacher, Know Thyself
 Jennifer E. Round 237–238

ESSAY

Moving beyond GK–12
 J. A. Ufnar, Susan Kuner, and V. L. Shepherd 239–247

ARTICLES

Biology Undergraduates’ Misconceptions about Genetic Drift
 T. M. Andrews, R. M. Price, L. S. Mead, T. L. McElhinny, A. Thanukos, K. E. Perez, C. F. Herreid, D. R. Terry, and P. P. Lemons 248–259

The Benefits of Multi-Year Research Experiences: Differences in Novice and Experienced Students' Reported Gains from Undergraduate Research	
Heather Thiry, Timothy J. Weston, Sandra L. Laursen, and Anne-Barrie Hunter	260–272
Facilitating Long-Term Changes in Student Approaches to Learning Science	
Brian J. Buchwitz, Catharine H. Beyer, Jon E. Peterson, Emile Pitre, Nevena Lalic, Paul D. Sampson, and Barbara T. Wakimoto	273–282
What Are They Thinking? Automated Analysis of Student Writing about Acid–Base Chemistry in Introductory Biology	
Kevin C. Haudek, Luanna B. Prevost, Rosa A. Moscarella, John Merrill, and Mark Urban-Lurain	283–293
Multiple-Choice Exams: An Obstacle for Higher-Level Thinking in Introductory Science Classes	
Kathrin F. Stanger-Hall	294–306
An Educational Intervention Designed to Increase Women's Leadership Self-Efficacy	
Carol Isaac, Anna Kaatz, Barbara Lee, and Molly Carnes	307–322
Student Learning Outcomes and Attitudes When Biotechnology Lab Partners Are of Different Academic Levels	
Heather B. Miller, D. Scott Witherow, and Susan Carson	323–332

On the Cover

Recommendations from the National Research Council (2005, *America's Lab Report*) were used as the design framework for a series of inquiry-based, integrated instructional units (I³Us) focused on introducing genomics and bioinformatics into commonly taught courses at all levels of the undergraduate curriculum. In a grassroots project that spanned three years, 16 faculty members from eight institutions developed and refined multiweek curricular modules that require students to formulate questions, design their own investigations, and construct scientific arguments and explanations based on data they have gathered and analyzed. Each of the peer-reviewed I³Us is based on vetted design principles with documented educational value: 1) they have clear pedagogical objectives; 2) they are integrated with lessons taught in the lecture; 3) they are designed to teach science content as well as process; and 4) they require student reflection and discussion. The Letter to the Editor by Banta and colleagues (page 203) introduces a web portal for the collection of genomics lab modules, including extensive links to downloadable teaching materials that can be customized by educators for courses from introductory biology through advanced courses in neurobiology, microbiology, bioinformatics, and plant genetics. Illustration by Erica Crespi and Jodi Schwarz.