

THE AMERICAN BIOLOGY TEACHER

Editorial Staff

Editor: William F. McComas
Parks Family Professor of
Science Education
University of Arkansas
ABTEditor@nabt.org

Cover Photo Editor: Julie Minbiole
jminbiole@colum.edu

Reviewing Editors: Julie Minbiole
Columbia College Chicago
jminbiole@colum.edu

Kate N. Walker
University of Arkansas
knwalker@uark.edu

Emily Weigel
Georgia Institute of Technology
emilygweigel@gmail.com

Suann Yang
SUNY Geneseo
yang@geneseo.edu

Managing Editor: Valerie Haff
managingeditor@nabt.org

ABT Production
Office: P.O. Box 3363
Warrenton, VA 20188
phone: (888) 501-NABT
Web site: www.nabt.org

Contributing
Columnists: Douglas Allchin
(allchindouglas@gmail.com)
James Morris, Brandeis University
(jmorris@brandeis.edu)

The American Biology Teacher (ISSN 0002-7685, e-ISSN 1938-4211) is published nine times a year (monthly except June and July, Nov/Dec combined) for the National Association of Biology Teachers in collaboration with University of California Press, 1111 Franklin Street, Oakland, CA 94607. Periodicals postage paid at Oakland, CA, and additional mailing offices POSTMASTER: Send address changes to ABT, University of California Press, 1111 Franklin Street, Oakland, CA 94607. E-mail: customerservice@ucpress.edu.

The American Biology Teacher is the official peer-reviewed journal of the National Association of Biology Teachers. All manuscripts must be submitted online at <http://abt.scholasticahq.com/>.

Requirements for submissions can be found in the ABT Authors & Photographers Guidelines located online at <https://nabt.org/Resources-American-Biology-Teacher>.

The comments and opinions expressed in this publication are not attributed to and do not necessarily represent the views of the National Association of Biology Teachers. Announcements and advertisements in this journal for products do not imply endorsement of or by NABT.

Membership Information

NAB membership is \$79 a year for full membership and \$149 for organizational membership in the United States, Canada, and Mexico; \$150 for full membership elsewhere. \$48 of annual membership dues applies to a subscription of *The American Biology Teacher*. Student, adjunct faculty and early career teacher memberships are \$35 and retired membership is \$60 (\$35 online only) if that person has been an NABT member for 10 years or more and is retired.

Subscriptions are offered on a calendar-year basis; members and subscribers receive all issues in the volume for the year in which their subscription is entered.

See <https://mps-ucpress.com/selectedJournal?jcode=ucpabt> for single issue and institutional subscription orders. For claims, please email customerservice@ucpress.edu. Domestic claims for nonreceipt of issues should be made within 90 days of the mail date; overseas claims within 180 days. Mail dates can be checked at: https://online.ucpress.edu/journals/pages/schedule_of_releases. UC Press does not begin accepting claims for an issue until thirty (30) days after the mail date. For back issues before volume 69, contact NABT at office@nabt.org.

Inquiries about advertising can be sent to latrese.wallace@wearcmci.com. For complete abstracting and indexing coverage for the journal, visit <https://online.ucpress.edu/abt>. All other inquiries can be directed to customerservice@ucpress.edu.

Copying and permissions notice: Authorization to copy article content beyond fair use (as specified in Sections 107 and 108 of the U.S. Copyright Law) for internal or personal use, or the internal or personal use of specific clients, is granted by The Regents of the University of California on behalf of the National Association of Biology Teachers for libraries and other users, provided that they are registered with and pay the specified fee through the Copyright Clearance Center (CCC), www.copyright.com. To reach the CCC's Customer Service Department, phone 978-750-8400 or write to info@copyright.com. For information on reprints and permissions, please visit <https://online.ucpress.edu/journals/pages/reprintspermissions>.

Department Editors

Book Reviews: Kirstin Milks & Frank Brown Cloud, Kirstin.milks@gmail.com
Classroom Materials & Media Reviews: Jeffrey D. Sack, sackjeffrey@comcast.net

Advertising Sales

Charlton Calhoun, NABT Account Executive,
ccalhoun@nabt.org and 401-964-3961

Guidelines for Authors

Guidelines for authors may be found at
<https://nabt.org/Resources-American-Biology-Teacher>

Printed by The Sheridan Press, on Forest Stewardship
Council®-certified paper

© 2024 National Association of Biology Teachers. All rights reserved.

For more information, visit www.nabt.org

Executive Director

Jaclyn Reeves-Pepin

Board of Directors

President: Amanda Townley
President-Elect: Kirstin Milks
Past President: Tara Jo Holmberg
Secretary/Treasurer: Jacqueline Washington
Director-at-Large: Kristy Daniel
Director-at-Large: Anne Metz
Director/Coordinator: Lee Ferguson
Director/Coordinator: David Butler

Regional Coordinators

Region I (CT, ME, MA, NH, RI, VT): Don Pinkerton
Region II (DE, DC, MD, NJ, NY, PA, VA): Nicole Veltre-Luton
Region III (IL, IN, MI, OH, WI): David Butler
Region IV (IA, KS, MN, MO, NE, ND, SD): Andrew Taylor
Region V (KY, NC, SC, TN, WV): Robin Bulleri
Region VI (AL, FL, GA, LA, MS, PR): Audra Brown Ward
Region VII (AZ, AR, NM, OK, TX): Lee Ferguson



Region VIII (CO, ID, MT, NV, UT, WY): Katina Marcos

Region IX (AK, CA, HI, OR, WA, Pacific Territories): Bethany Cates

Region X (Canadian Provinces & Territories): Martha Schissler

Committee Chairs

ABT Journal Advisory Committee: William F. McComas
Awards Committee: Kathy Van Hoeck
Finance Committee: Jacqueline Washington
Honorary Membership Committee: Kirstin Milks
JEDI Committee: Enya Granados
Member Resources Committee: Catherine Ambos
Nominating Committee: Bob Melton
Professional Development Committee: Vacant
Retired Members Committee: Dennis Gathmann

Section Chairs

AP Biology Section: Mark Little
BioClub Section: Ashlie Gowitzka
Four-Year College & University Section: Troy Nash
Two-Year College Section: Cleo Rolle