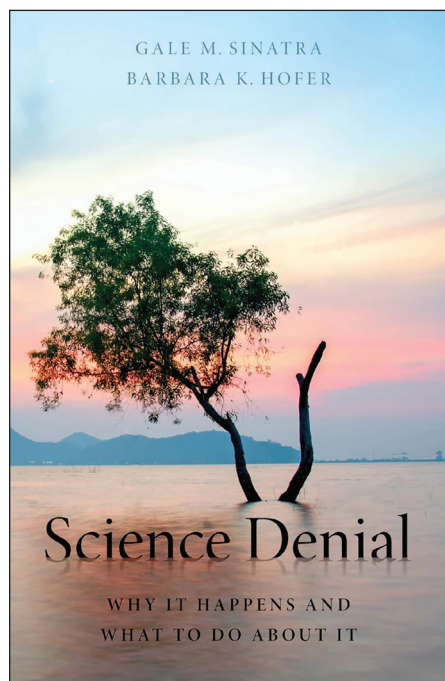


*How to Talk to a Science Denier: Conversations with Flat Earthers, Climate Deniers, and Others Who Defy Reason.* By Lee McIntyre. 2021. MIT Press. (ISBN 978-0-262-04610-7). 264 pp. Hardcover, \$24.95. Paperback and ebook also available.

*Science Denial: Why It Happens and What to Do About It.* By Gale M. Sinatra & Barbara K. Hofer. 2021. Oxford University Press. (ISBN 978-0-19-094468-1). 193 pp. Hardcover, \$37.99. Paperback and ebook also available.

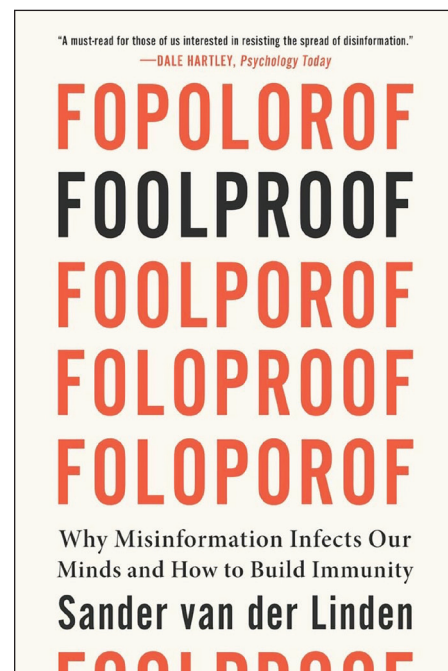
*Foolproof: Why Misinformation Infects Our Minds and How to Build Immunity.* By Sander van der Linden. 2023. W.W. Norton. (ISBN 978-0-393-88144-8). Hardcover. 358 pp. \$30.00. Ebook, paperback and audio also available.

*Verified: How to Think Straight, Get Duped Less, and Make Better Decisions about What to Believe Online.* By Mike Caulfield and Sam Wineburg. 2023. University of Chicago Press. (ISBN: 978-0-226-82984-5). 280 pp. Ebook (PDF), \$13.99. Hardcover and paperback also available.



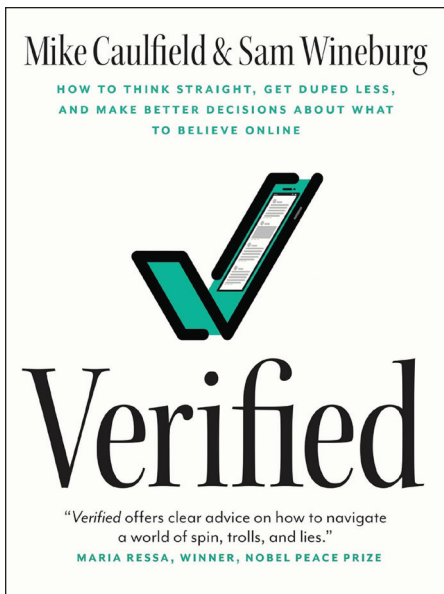
Four recent books address the current misinformation crisis, science “denial,” and trust in the scientific consensus. They raise important questions for biology teachers: Are some approaches to science “denial” guilty of blaming the victim? Can we provision students to make judgments about scientific evidence on their own, or must they ultimately rely on experts? How are consumers of science beguiled by persuasive techniques? Should media literacy now be an integral part of science teaching?

In *How to Talk to a Science Denier*, philosopher Lee McIntyre seems quite proud that he could walk into a Flat Earthers’ convention and not say a word for 24 hours. He has written previously on “the skeptical attitude” and the problem of “post-truth,” so his effort to “reach out” to those he once disparaged seems to have been a personal challenge. McIntyre seeks out conversations with climate-change naysayers, coal miners, anti-vaxxers, and GMO-skeptics. His primary “revelation”? After meandering through the philosophical literature and



psychological research, he concludes that to achieve conceptual change, you should engage in respectful dialogue. “Empathy, warmth, and human understanding” (p. 160), he concludes, are tools that open trust. Of course, this is well known by experienced constructivist teachers! Once there is a personal relationship, one can entertain more rational discussion: graphs, appeals to consensus, and rebuttals based on describing logical fallacies or persuasive techniques (pp. 171–174).

The lessons from the second volume, *Science Denial*, may be familiar to ABT readers, from a December 2022 editorial by its two authors, educational psychologists Barbara Hofer and Gail Sinatra. That short essay is an abridged section from their book’s final chapter and summarizes their message well. Like McIntyre, they focus on “denial, doubt, and resistance,” construed as deviations from normal (proper) thinking. They provide five explanations: cognitive biases, flawed basic epistemological beliefs, motivation, emotions, and social identity.



Hofer and Sinatra's discussion is richly informed by their classroom research and illustrated with numerous personal anecdotes. Each chapter ends with explicit advice on "What You Can Do," sorted by different roles in the educational ecosystem. The book is well structured and easy to read episodically. However, I found their approach often reflecting a deficit model of science communication and education. There seems little benefit in confronting naïve students as misguided or "wrong," or maligning some imagined "lazy" thinking. Instead, we might engage, inform, and reshape existing motivations and emotions. The authors do not delve deeply here into *why* we should trust science—or why anyone should *want* to trust science, even while they acknowledge that it is important. What might it mean to focus on how to make science inviting and show how it earns trust, rather than bemoan those who reject it or merely expect trust as a default?

In *Foolproof*, social psychologist Sander van der Linden offers an analogy for the spread of misinformation that biology teachers can readily appreciate: he likens it to a virus of the mind, explaining that we can be infected with beguiling falsehoods that are transmitted across the media landscape and through the population. Van der Linden's proposed solution, therefore, is

to imagine psychological vaccinations, or inoculation against being victimized—also known as "prebunking." This is achieved by helping consumers become familiar with the various stratagems used as "weapons of mass persuasion": how others try to hijack our intuitive cognition into believing, and then sharing, information that may not be true. This prophylactic tactic has been tested and seems effective. The manipulative techniques described in *Foolproof* are nicely packaged in the mnemonic acronym DEPICT: Discrediting, Emotion, Polarization, Impersonation, Conspiracy, and Trolling. Van der Linden also distinguishes misinformation—typically a result of relying on inaccurate information (by living in a filter bubble or echo chamber)—from conspiratorial thinking; different strategies are needed to address each. I found the writing crisp and well organized, easy to read and digest in fragments with each chapter ending with a bullet-point list of simple take-home messages. Forewarned is forearmed, and this book is a good "how-to" primer on defending against manipulative persuasion.

In *Verified*, Caulfield and Wineburg, a historian/educator and an information literacy specialist, focus more narrowly, perhaps: just on online reasoning. Their acronym is SIFT: Stop, Investigate the source, Find better coverage, and Trace the claim (or quote or video) to the original context. "Stop" is an antidote to our tendency to race ahead, whether you call it jumping to a conclusion, hasty generalization, relying on first impressions, confirmation bias, or predictive neural programming. "Investigate the source" reflects the importance of credibility, not just the erroneous evidence or selective argument that a purveyor of misinformation wants you to hear. "Find other coverage" because the internet is awash with information and you can easily check questionable claims or consult better sources. And, finally, "trace the original" to establish context and meaning, and to expose misrepresentation. Namely, separate authentic science from bogus *reports of science*. A key overall theme is "do what fact-checkers do": leverage the vast information on the web to disarm the *misinformation* also on the web and social media. The

authors demonstrate these skills and their variants through numerous authentic examples, both humorous and profound. You learn the cautionary practices that Sinatra and Hofer merely allude to. The language is lively and pithy, suitable for students.

*Verified* indirectly raises a provocative question for science teachers: what is the relationship between scientific research in a lab or field site and media literacy? Both strive to ascertain the facts—the "real" facts, not illusions or mere plausibilities. Both involve evidence, although of different kinds: science focuses on observations and empirical results, while an online search focuses instead on the evidence for the credibility and expertise of the source. Examining the credentials and track record is parallel to checking the reliability of an instrument or lab procedure. Consulting a second source is like calibrating an instrument or running a controlled experiment. Finally, tracing originals is akin to checking experimental assumptions or the legitimacy of proxy variables. Both science and media literacy have methods to root out possible errors and ensure reliability. And for most of our students—those who will not pursue professional careers in science—who seek scientific information, which seems most important? Namely, what role does learning skills in science media literacy have in a science classroom if the aim is to develop competent citizens and consumers of science? Caulfield and Wineburg also delve into the foundational issues of what makes a claim, scientific or otherwise, reliable in the public sphere: expertise and consensus (Chapter 5) and peer review (Chapter 6), critical topics often missing in the science classroom. My verdict on *Verified*? Engaging, insightful, and useful.

How to Talk to a  
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 Science Denial: 🌿🌿🌿  
 Foolproof: 🌿🌿🌿  
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