Editor's Corner

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Where's the Evidence?

"What evidence do you have for that idea?" It is a simple question, but one asked far less than it should be. Too often, we hear justifications such as, "Everybody knows that…," "It's what I've heard," or "It's just what I believe."

Formulating explanations based on evidence is a distinguishing characteristic of scientific inquiry. The National Science Education Standards emphasize the importance of evidence-based reasoning, calling for learners to "give priority to evidence…formulate explanations from evidence…[and] communicate and justify their proposed explanations" (NRC 2000, p. 25). And yet, from news media to politics to the internet, so much of public discourse fails to provide significant evidence for its claims. For example, in a recent study from the Pew Research Center for the People & the Press, 76% of scientists questioned said it is a "major problem" that news reports fail to distinguish between well-founded findings and those that are not (2009).

To be sure, for many issues—perhaps most—evidence is limited or insufficient. Much of life, even in science, requires making decisions based on imperfect evidence. Nonscientific ways of thinking—in art, literature, and religion, for example—can offer different and important perspectives.

The core of scientific reasoning is evidence-based critical thinking, which requires us to question everything, treat all conclusions as tentative, and set aside interpretations that are not supported by evidence. This type of thinking is hard work, and yet teaching it is perhaps the most important thing we do as educators. The ability to use evidence to construct explanations is at the core of scientific enterprise and the main defense against misconception and pseudoscience.

The notion that reasoning should be based on evidence applies not only to the habits of mind we want to engender in our students, but also to our own teaching practices. In this issue of *The Science Teacher,* Jessica Thompson and her coauthors describe an example of how science departments can use evidence from their classes to improve teaching and learning (pp. 48–52). There are also examples of activities that promote students' evidence-based reasoning in laboratory investigations (Sampson, pp. 42–47, and Rau, pp. 30–35), case studies (Graves, pp. 24–29), and even when questioning common folklore about cricket chirping and temperature (Larsen, pp. 37–41).

At no other time in our history has the value of clear, rational scientific thinking been more apparent. If our students routinely make decisions without searching for and evaluating evidence, how can they reject the charlatans of pseudoscience and learn to critically evaluate the important questions that they encounter daily, from global warming to personal health issues? "It's just what I believe" is simply not good enough.

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