

Lesson Plan: Evaluating sources -- What's a 'reliable' source?

Frame: Authority is constructed and contextual

Learning objectives

Students will...

- compare information about sources to determine if they are appropriate for use
- identify features of a source to help determine relevance and reliability in a given context

Background

This activity follows a discussion of the "War on Science" issue of National Geographic. The issue discusses the disconnect between many ideas that are commonly accepted in the scientific community and the frequent rejection of such concepts by the public at large: "empowered by their own sources of information and their own interpretations of research, doubters have declared war on the consensus of experts."¹ Through the internet, the information provided by non-experts has become abundantly available, thus it is becoming increasingly critical to distinguish credible, reliable, valid information from information that is false or presented with a bias.

Activity Summary

Students will work in groups of two. Each student will receive one of the three articles listed below, then complete the information on the table for their article. Students may use the internet to look up bios, determine if an article is peer reviewed, etc. The students should then discuss as a group if an article should be ignored, or saved as a source. The students will be asked to explain how they came to these conclusions. Students will likely have some debate regarding the Dicks article. After the activity, plug the search terms bees neonicotinoids into Google (Google results change frequently, but at the time this lesson was designed, the Entine article ranked 3rd in results). Allow students time to discuss what this means about their search techniques.

Materials

Lynn Dicks, "Bees, lies and evidence-based policy," *Nature* 494, no. 7437 (2013): 283-283.

<http://www.nature.com/news/bees-lies-and-evidence-based-policy-1.12443>

Jon Entine, "Bee deaths reversal: As Evidence Points Away From Neonics As Driver, Pressure Builds To Rethink Ban," *Forbes*, February 5, 2014.

<http://www.forbes.com/sites/jonentine/2014/02/05/bee-deaths-reversal-as-evidence-points-away-from-neonics-as-driver-pressure-builds-to-rethink-ban/>

Tapparo, Andrea, Daniele Marton, Chiara Giorio, Alessandro Zanella, Lidia Soldà, Matteo Marzaro, Linda Vivan, and Vincenzo Girolami. "Assessment of the environmental exposure of honeybees to particulate matter containing neonicotinoid insecticides coming from corn coated seeds."

Environmental Science & Technology 46, no. 5 (2012): 2592-2599.

<http://www.ask-force.org/web/Bees/Tapparo-Assessment-Environmental-Exposure-Honeybees-2012.pdf>

¹ Joel Achenbach. "Why Do Many Reasonable People Doubt Science?" *National Geographic*, March 2015.
<http://ngm.nationalgeographic.com/print/2015/03/science-doubters/achenbach-text>

Activity

Background

Imagine you are an aide working for a legislator. The legislator is concerned about the environmental ramifications of widely used neonicotinoid pesticides and would like more information before making a policy decision regarding whether the pesticides should be restricted. Because the legislator's decision affects a large number of people, it is essential that you provide relevant, recent, scientifically valid information that comes from experts in the field. You don't have a lot of time to generate your report so you must act fast in deciding if a source should be examined further or ignored.

Directions

1. Each partner should take a different article. Independently, complete the table with information from your article. You are welcome to search the web to more information.
2. When all members of the group have completed the information for their article, share with the group to complete the table.
3. Within your group, discuss/debate the "Discussion Questions" below. Be prepared to share your thoughts with the class.

Article Title	"Assessment of the environmental exposure of honeybees to particulate matter containing neonicotinoid insecticides coming from corn coated seeds"	"Bee Deaths Reversal: As Evidence Points Away From Neonics As Driver, Pressure Builds To Rethink Ban"	"Bees, lies and evidence-based policy"
Date	2012		
Publication Title	Environmental Science & Technology		
Is the <u>publication</u> peer reviewed?	Yes		
Is the <u>article</u> peer reviewed? (Hint: look at the <i>type</i> of article)	Yes		
First author & credentials (Current position, degrees, etc.)	Andrea Tapparo Degree: Chemistry Current: University of Padova - Department of Chemical Sciences		

Discussion Questions

1. Based on each of the following factors **independently**, which article is the most relevant/recent/reliable:
 - a. Title
 - b. Date
 - c. Publication
 - d. Author's credentials
2. Which articles do you think should be used to inform the decision of the legislator? Which should be ignored? Why?
3. In what discipline is Andrea Tapparo be considered an expert? Lynn Dicks? Jon Entine
4. Search in Google: `bees neonicotinoids`. Which of the 3 articles is displayed in the top results? What could you do differently to get the most credible sources in a search?
5. Do you think a different scenario or research question would change how you view the credibility of these sources? Why or why not?