

Seeking Models and Evidence in Research Articles

Teacher Guide

Background:

Refer to the “Theory to Practice Teacher Guide” for this project which cites evidence that students can transfer skills garnered from engaging in MELs: “Recent theoretical work provides promise for transferring MEL evaluation beyond the context of the activity. Specifically, Nussbaum & Asterhan (2016) suggest that students may become *conceptual agents* (i.e., active and critical evaluators of explanations about phenomena) when they engage in both constructing and using MEL activities. Such construction and use may promote substantial cognitive and agentic engagement (Sinatra et al., 2015), which in turn, could help students internalize the MEL scaffold into a mental representation for application and transfer to real-world situations.” This transfer task determines how well students transfer these skills to new situations, such as evaluating the claims in a science article.

Steps for Implementation:

1. Students read the article either by themselves or in small groups using “low-voice” read-aloud technique. Encourage the students to mark up the article to highlight important points. If this is a summative assessment, consider having students work individually.
2. Students complete the table and answer Questions 1-3.
3. Students meet in groups to discuss the article and contents of their tables.
 - How did the plausibility evaluation classification (Question 1) vary among your group members?
 - What were the key lines of evidence presented?
 - How well did each line of evidence support the model individually and when coupled with the other lines of evidence?
4. Whole Class Discussion
 - Review table contents and answers to questions, followed with questions such as these:
 - How did your discussion with your group help your understanding of the content of the article?
 - Did you identify additional lines of evidence after your group discussions?
 - Were there any alternative models presented in this article? If so, how did you rate them? Why?

Teacher Reflection:

Review student work and consider the following questions when assessing their responses.

- How do your students evaluate models and evidence when presented with evidence? In what ways might you modify this activity to help students think more critically about models and evidence?
- What did students do differently when evaluating articles compared to the MEL task? What similarities?
- What are some of the challenges for students in evaluating evidence to model connections?
- How do students consider alternative models in relationship to the model at the focus of the article?

Possible Articles:

Here is a list of suggested articles for this task; however, the topics do not necessarily mirror the content of the MELs and baMELs. The criteria used to select these articles included readability level, the research behind the investigations and some of its findings (as opposed to an encyclopedic entry), and the articles being contemporary/engaging. Consider these criteria when seeking your own articles to use for this task.

<p>Title: An ancient cold snap causes heated debate: The claim that a comet was responsible just won't die Date: August 9, 2018 Article focus: Astronomy Link: https://www.sciencenewsforstudents.org/article/ancient-cold-snap-causes-heated-debate Readability: Grade 8 (https://www.webpagefx.com/tools/read-able/)</p>	<p>Title: Antarctica's melting speeds up: The continent has lost about 3 trillion metric tons of ice since 1992, raising global sea levels Date: July 18, 2018 Article focus: Weather and Climate Link: https://www.sciencenewsforstudents.org/article/antarcticas-melting-speeds Readability: Grade 7 (https://www.webpagefx.com/tools/read-able/)</p>
<p>Title: Is Zealandia a continent? Landmass lies mostly beneath the Pacific Ocean Date: March 13, 2017 Article focus: Geology Link: https://www.sciencenewsforstudents.org/article/zealandia-a-continent Readability: Grade 8 (https://www.webpagefx.com/tools/read-able/)</p>	<p>Title: What killed the dinosaurs? New rocky evidence has been emerging about the dinos' final days Date: January 30, 2017 Article focus: Fossils with Animals, Earth Science Link: https://www.sciencenewsforstudents.org/article/dinosaurs-extinction-asteroid-eruptions-doom Readability: Grade 9 (https://www.webpagefx.com/tools/read-able/)</p>
<p>Title: Oxygen-rich air emerged super early, new data show: If correct, it occurred before the evolution of animal life Date: August 21, 2016 Article focus: Earth Science with Chemistry, Evolution Link: https://www.sciencenewsforstudents.org/article/oxygen-rich-air-emerged-super-early-new-data-show Readability: Grade 7 (https://www.webpagefx.com/tools/read-able/)</p>	<p>Title: Western U.S. on the rise: Ongoing drought-induced uplift in the western United States Date: September 26, 2014 (AAAS Science article date) Article focus: Water use Link: https://www.scienceintheclassroom.org/research-papers/western-us-rise Readability: Grade 8 (https://www.webpagefx.com/tools/read-able/)</p>
<p>Title: Distant galaxy seems filled with dark matter Date: September 21, 2018 Article focus: Astronomy, physics, deep space Link: https://www.sciencenewsforstudents.org/article/distant-galaxy-seems-filled-dark-matter Readability: Grade 8 (https://www.webpagefx.com/tools/read-able/check.php)</p>	<p>Title: New tools aim to better predict blooms of toxic algae Date: September 19, 2018 Article focus: Oceans, ecosystems Link: https://www.sciencenewsforstudents.org/article/new-tools-aim-better-predict-blooms-toxic-algae Readability: Grade 8 (https://www.webpagefx.com/tools/read-able/check.php)</p>
<p>Title: Ocean heat waves are on the rise - and killing coral Date: May 18, 2018 Article focus: Oceans, climate, animals Link: https://www.sciencenewsforstudents.org/article/ocean-heat-waves-are-rise-and-killing-coral Readability: Grade 7 (https://www.webpagefx.com/tools/read-able/)</p>	<p>Title: Water waves can have literally seismic impacts Date: January 12, 2018 Article focus: Earth, geology, physics Link: https://www.sciencenewsforstudents.org/article/water-waves-can-have-literally-seismic-impacts Readability: Grade 7 (https://www.webpagefx.com/tools/read-able/)</p>