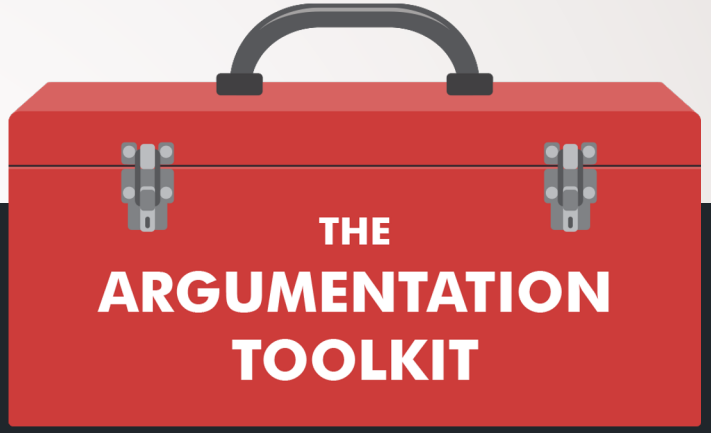
Advanced Module on the Science Seminar



Session #4: *How do you support students writing a scientific argument after a science seminar?*

Session #4 Agenda

How do you support students writing a scientific argument after a science seminar?

- Extension Discussion: *Try it with your students!*

1. Video: Writing for a Hypothetical Audience
2. Presentation: Roles and Expectations for the Science Seminar
3. Guided Practice: Analyzing a Student Argument
4. Presentation: Introduction to the Argumentation Rubric
5. Activity: Analyzing Student Arguments Using the Rubric
6. Takeaways

Extension Discussion: *Try it!*

If you ran a science seminar with your students, discuss:

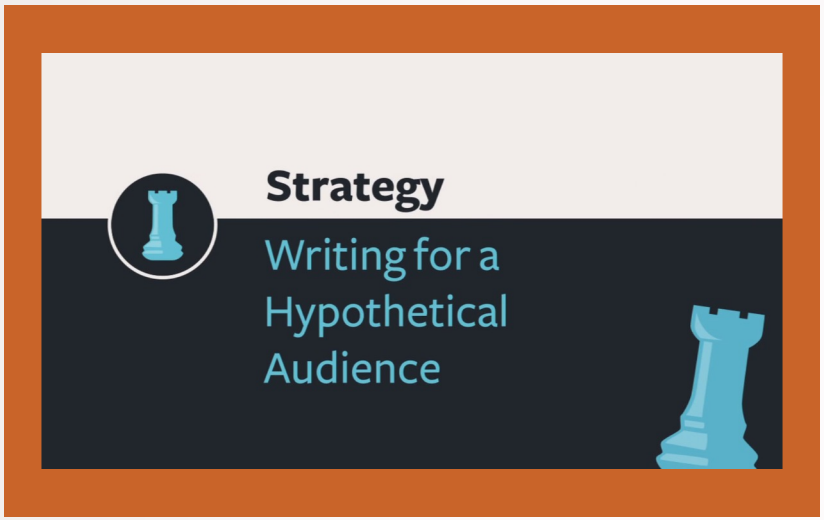
1. What went well?

2. What strategies did you implement?

3. What was challenging?

4. What additional support do you need to run the science seminar successfully in your classroom?

1. Video & Discussion: Writing for a Hypothetical Audience



Watch the video below, which introduces the "hypothetical audience" as a tool to support student writing of scientific arguments.

Discussion Questions:

1. In what ways could the science seminar support students in writing convincing arguments?
2. What are some strategies from the video or your own experience to support student writing of arguments?
3. What do you see as key characteristics you would like to see in your students' written arguments?

2. Guided Practice: Analyze a Student Argument

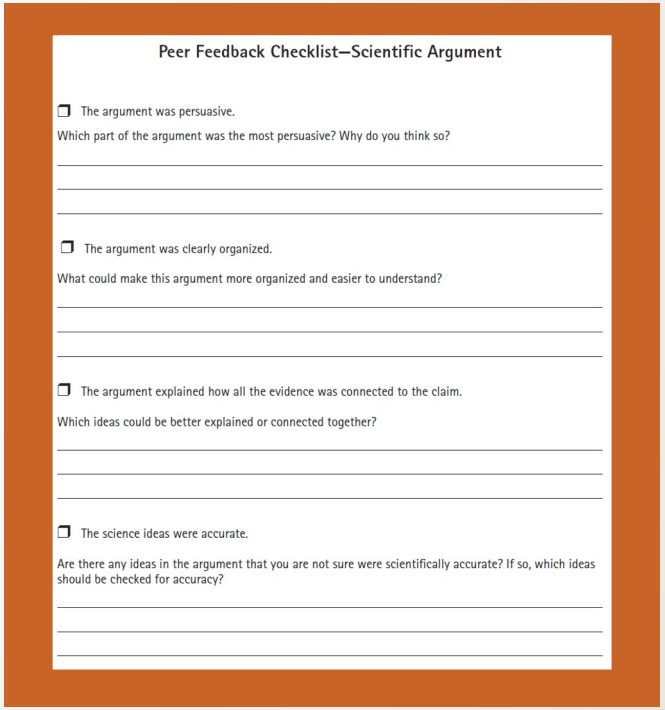
Guidelines for Writing a Scientific Argument

- **Be persuasive.** Show the reader how your claim is clearly supported by the evidence.
- **Include a claim** that answers a question about the natural world.
- **Include evidence** that supports the claim.
- **Explain your reasoning** to show how the evidence supports or connects to the claim.

Student Writing Example

The location of the mountain range causes little or no rain in the Atacama Desert. My evidence is that the west side of the mountains only gets 8 inches or less of rain, but there is between 16 and 24 inches of rain per year on the east side. There is more rain on the east side of the mountains because of the rain shadow effect, which happens when winds hit a mountain range and are pushed up. It is colder at the top of the mountain, and cold air cannot hold as much water, so it rains as the air rises over the tall mountains on the east. Once the wind reaches the other side of the mountain, there is very little water left. So there is only dry air for the west side of the mountain in the Atacama Desert.

Use the Peer Feedback Checklist to identify the strengths and weaknesses of this student argument.



Peer Feedback Checklist—Scientific Argument

❒ The argument was persuasive.

Which part of the argument was the most persuasive? Why do you think so?

❒ The argument was clearly organized.

What could make this argument more organized and easier to understand?

❒ The argument explained how all the evidence was connected to the claim.

Which ideas could be better explained or connected together?

❒ The science ideas were accurate.

Are there any ideas in the argument that you are not sure were scientifically accurate? If so, which ideas should be checked for accuracy?

3. Presentation: Introduction to the Argumentation Rubric

Rubric for Writing a Scientific Argument

weaker <----------> stronger

	1	2	3	4	5
ORGANIZATION Are all aspects of a scientific argument included?	Does not state a claim or claim does not address the question being considered.	States a claim that responds to the question but no additional information is included as evidence to support the claim.	States a claim and lists or describes information as evidence but does not connect evidence to different parts of the claim.	States a claim and connects evidence with different parts of the claim but ideas are not clearly organized to help reader follow the overall argument.	States a claim, connects evidence with different parts of the claim, and ideas are clearly organized to help reader follow the overall argument.
CONNECTIONS Are the ideas well connected?	No evidence is included.	Includes evidence but does not indicate how evidence connects to other evidence or to parts of the claim.	Clearly states some connections between evidence and the claim.	Clearly states most connections between evidence and the claim.	Each part of the claim is supported by evidence, and connections between all evidence and the claim are clearly stated.
ACCURACY Are the ideas scientifically accurate?	Claim is an inaccurate answer, or ideas and conclusions (stated or suggested) are inaccurate.	Claim is an accurate but partial answer. The ideas are accurate, but one or more is used inaccurately to support the claim.	Claim is an accurate but partial answer to the question. Each idea is accurate, but at least one is used in a way that is not scientifically relevant.	Claim is an accurate but partial answer to the question. All ideas that are stated and used to support the claim are scientifically sound.	Claim is an accurate and thorough answer to the question. All ideas that are stated and used to support the claim are scientifically sound.

4. Analyzing Student Arguments Using the Rubric

- In pairs or small groups, use the rubric to rate the strengths and weaknesses of each argument.

- Discuss the following questions:
  1. Which argument was the strongest? Why?
  2. Which argument was the weakest? Why?
  3. How could you use this rubric in your classroom to provide feedback to your students?

5. Session Takeaways

Engaging students in a science seminar can support students in writing stronger arguments.

Teachers can use a variety of strategies to support student writing, such as encouraging students to consider an audience and giving them opportunities for peer critique.

Tools such as the argument rubric and peer feedback checklist can be used to help students write stronger arguments.

THE ARGUMENTATION TOOLKIT

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THE ARGUMENTATION TOOLKIT

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