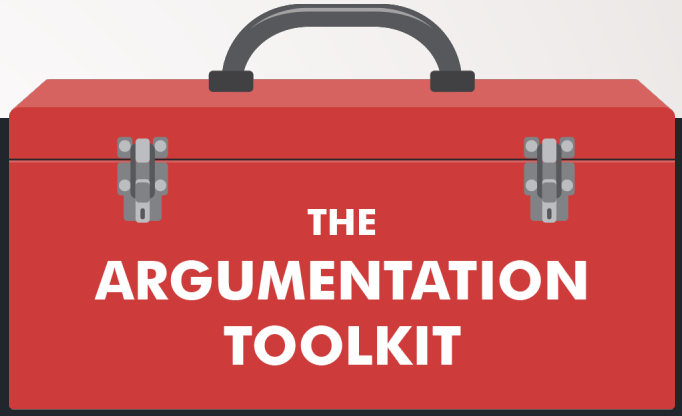
The PowerPoint and handouts for today's workshop can be found at **argumentationtoolkit.org** under the "About" tab



Encouraging Productive Student Discussions Around Arguments in Science

María González-Howard, University of Texas at Austin

THE ARGUMENTATION TOOLKIT

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Agenda

1. Overview of the Session and Introductions (5 min)
2. Video: Introduction to Argumentation (5 min)
3. Activity: Let's do a Card Sort! (25 min)
4. Activity: Analyze Data about the Atacama Desert (15 min)
5. Video: Promoting Student Interactions in Science Seminars (10 min)
6. Activity: Let's engage in a Science Seminar! (25 min)
7. Using the Learning Modules in the Argumentation Toolkit (5 min)

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Check in…

1. How often do students discuss scientific arguments in your classroom?

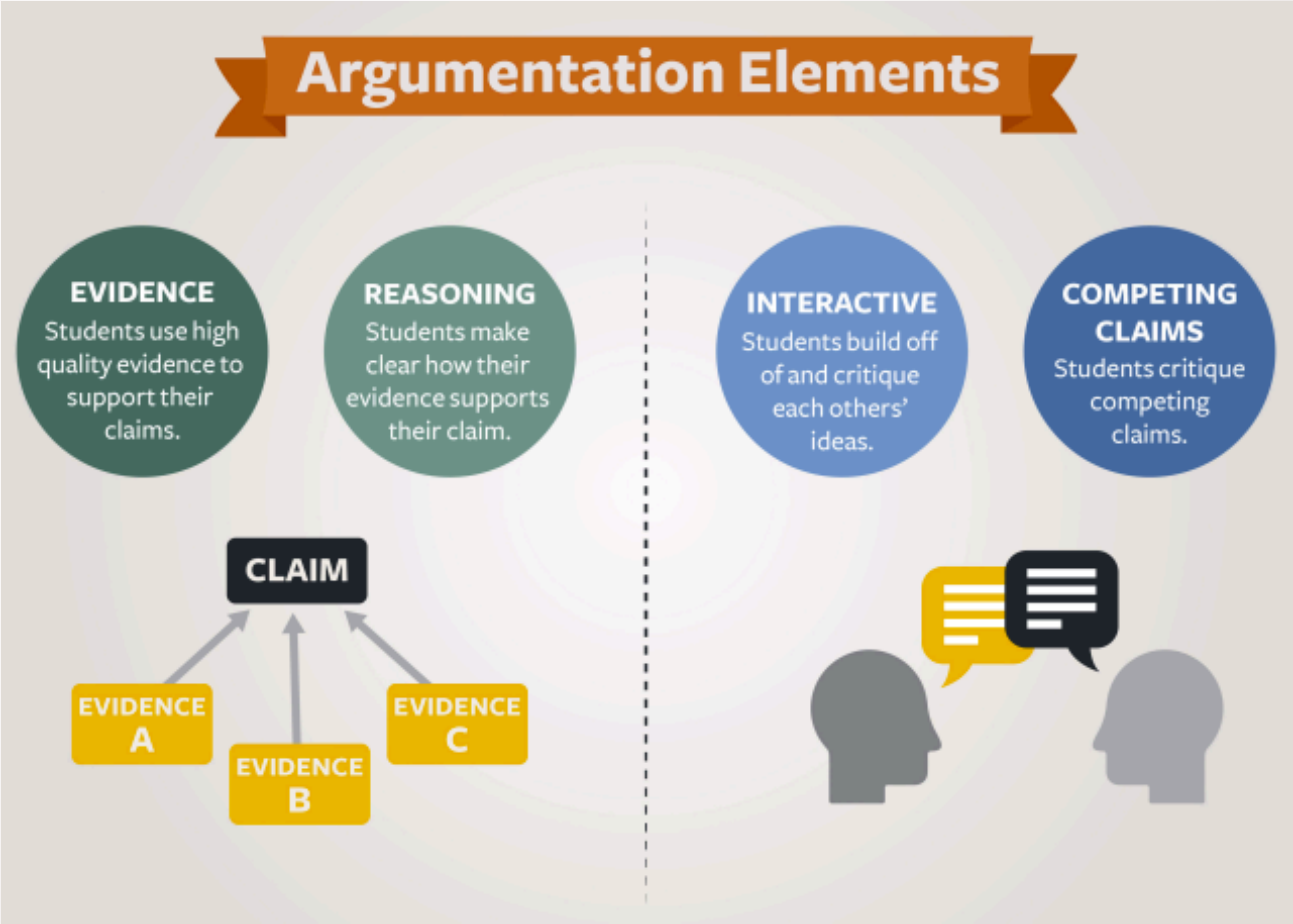
2. How comfortable do you feel supporting these discussions?

2. Video: Introduction to Argumentation

Let's watch a video that provides an introduction to scientific argumentation!

2. Video: Introduction to Argumentation

What does it mean to engage in argumentation?



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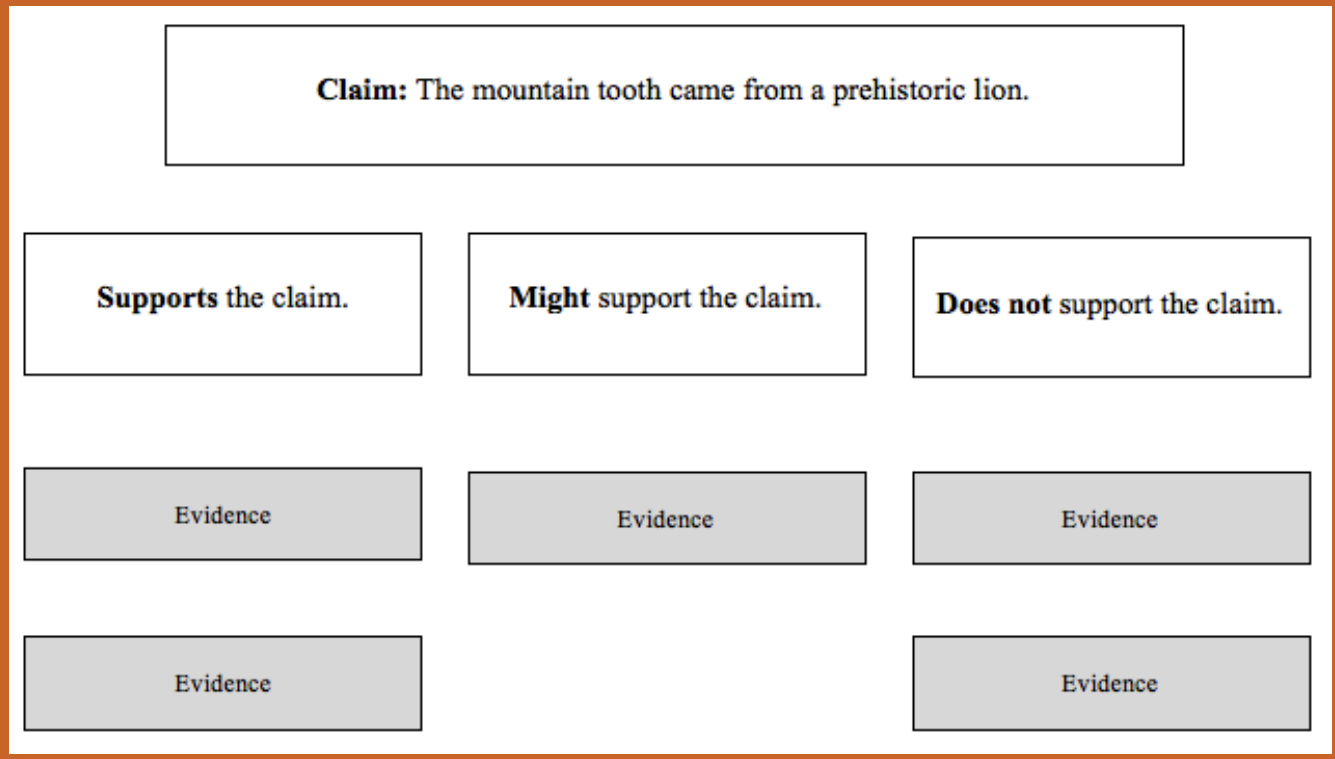
3. Activity: Let's do a Card Sort!

The task:

- Work in pairs or small groups to sort cards as supporting, maybe supporting, or not supporting the claim – The fossil tooth came from a prehistoric mountain lion, which is related to mountain lions that live today.
- Make sure to articulate *why* you sort cards as you do

Setting up your cards



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Discussion about Card Sort

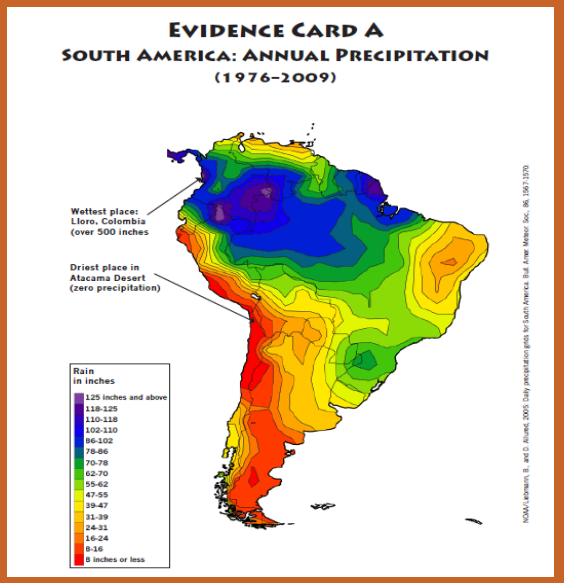
- What did you talk about when you were discussing the evidence?
- What types of questions did you ask?
- How can you envision your students engaging in this activity? What would work well? What challenges would they have?

Discussion about Card Sort continued…

- There are many variations to a card sort! (e.g., one versus two claims, introducing additional evidence, evidence can take on many forms [not just textual], supporting evidence can then be further sorted, etc.)
- **Brainstorm and share out:** How might you incorporate a card sort into your classroom this coming year?

What is a science seminar?

4. Activity: Analyze Data about the Atacama Desert



The task:

- The goal of this activity is to analyze data about the Atacama Desert and determine which claim is best supported.
- You will work in pairs or small groups to analyze the data and complete the worksheet in preparation for the science seminar.

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Why Does the Atacama Desert Get So Little Precipitation?

Claim 1: Prevailing winds on the Pacific coast cause extremely low precipitation in the Atacama Desert.

Claim 2: The location of mountain ranges causes extremely low precipitation in the Atacama Desert.

Claim 3: Surface temperatures of the ocean cause extremely low precipitation in the Atacama Desert.

Discussion

- What do you think it would it be like to do this type of activity with your students?
- How might this type of activity support student participation in a science seminar?
- What challenges do you think your students might have with this type of activity?

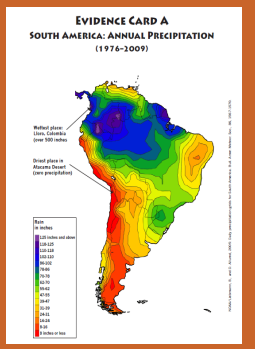
5. Video: Promoting Student Interactions in Science Seminars

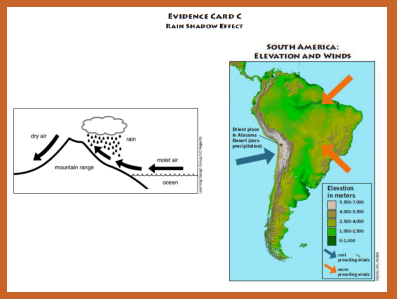
Let's watch a video that describes strategies for how to promote student interactions during a science seminar.

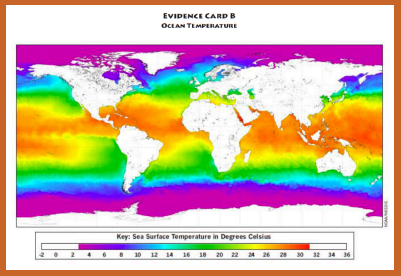
Discussion Questions:

- Which of these strategies do you think would be most useful to your students?
- Which of these strategies do you think will be most challenging for you to implement?

6. Activity: Let's engage in a Science Seminar!







Why Does the Atacama Desert Get So Little Precipitation?

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Discussion about the Science Seminar

- As a "student," what worked well for you? What was challenging?
- What types of interactional strategies can you see your students needing in order to engage in a science seminar?

Discussion about the Science Seminar continued…

- There are many variations to a science seminar! (e.g., students given claims, when it occurs in a unit, claims being complimentary versus competing, if the evidence is given or student collected, etc.)

- **Brainstorm and share out:** How might you incorporate a science seminar into your classroom this coming year?

7. Using the Learning Modules in the Argumentation Toolkit
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Organized by Learning Module

The modules each include a sequence of four 45-minute sessions for a total of 3 hours. These can be used for one longer meeting (i.e. 3 hours) or used over multiple sessions (4 sessions 1 month apart, each for 45 minutes). We recommend using the Introductory Module on Scientific Argumentation first. Any of the other modules may be used after the first one depending on the needs and interests of teachers.

Module Name	Description
• Introductory Module on Scientific Argumentation	• Goal - Introduces the four argument elements. • DCI - Life science focused on fossil record (MS-LS4-1, MS-LS4-2) and the human body systems (MS-LS1-3)
• Advanced Module - Science Seminar	• Goal - Introduces the science seminar, an argumentation activity. • DCI - Earth science focused on weather (MS-ESS2-5) and climate (MS-ESS2-6)
• Advanced Module - Designing Rich Argumentation Tasks	• Goal - Introduces four criteria and other considerations when designing rich argumentation tasks • DCI - Life science focused on growth, development and reproduction of organisms (MS-LS1-5) and fossil record (MS-LS4-1)
• Advanced Module - Evidence and Reasoning	• Goal - Supports teachers in helping students overcome common challenges in using evidence and reasoning in scientific arguments. • DCI - Earth science focused on earth processes, such as earthquakes (MS-ESS2-2), the cycling of earth materials (MS-ESS2-1), and the force of gravity (MS-ESS2-4).

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7. Using the Learning Modules in the Argumentation Toolkit
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Agenda

The agenda for this module's sessions can be found within each session's page. However, you can also click here for a downloadable version of the agenda that cuts across all four sessions in this introductory module.

Session Name	Description	Length
Session #1: What is the role of evidence in a scientific argument?	This session introduces the four areas of argumentation that students need extra support in, and then focuses specifically on the role of evidence.	45 minutes
Session #2: How does considering competing claims support students' use of evidence and reasoning?	This session illustrates how engaging students in competing claims supports their use of evidence and reasoning, and also deepens their understanding of the science content.	45 minutes
Session #3: What is the role of reasoning in a scientific argument?	This session focuses on the role of reasoning, and introduces an instructional strategy that can help students incorporate reasoning into their written arguments.	45 minutes
Session #4: How do we support students in interacting with peers during argumentation?	This session highlights the interactive nature of argumentation using an activity in which students analyze data with peers.	45 minutes

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7. Using the Learning Modules in the Argumentation Toolkit
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Organized by Session

The sessions that make up these modules can also be accessed individually, either by argumentation element (e.g. evidence, competing claims) or by activity (e.g. card sort, student writing). Each session is 45 minutes long. If you do select sessions here, consider the background of the teachers. The sessions pulled from the Advanced Modules assume some familiarity with the argumentation elements. See this organization below.

Session Name	Argumentation Element	Activity
• What is the role of evidence in a scientific argument?	• Evidence	• Card Sort
• How does considering competing claims support students' use of evidence and reasoning?	• Competing Claims	• Cart Sort
• What is the role of reasoning in a scientific argument?	• Reasoning	• Reasoning Tool, Student Writing

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The Argumentation Toolkit

Home | Intro | Argument Elements | Resources | Teacher Learning | About

What is the role of evidence in a scientific argument?

Session Goals:

- Teachers will be introduced to four areas of argumentation in which students need extra support: 1) Evidence, 2) Reasoning, 3) Student Interaction and 4) Competing Claims.
- Teachers will develop an understanding of argumentation as a social process in which students build, question and critique claims using evidence and reasoning.
- Teachers will be introduced to a Card Sort as an instructional activity that encourages students to think about what evidence does and does not support a claim.
- Teachers will design a new lesson or revise an existing lesson to integrate argumentation into their science instruction.*
- Teachers will identify areas of argumentation that are challenging for their students.*

*Note: These final two goals are only applicable if the module is implemented as multiple sessions

Agenda:

1. Video: Introduction to module
2. Activity: Mystery card sort 1
3. Video & Discussion: Encouraging talk about evidence
4. Session takeaways

**Extension - Try it with your students!*

Materials:

1. Detailed agenda for facilitator
2. Card Sort 1

Presentation View

Questions and Contact Information

Questions???

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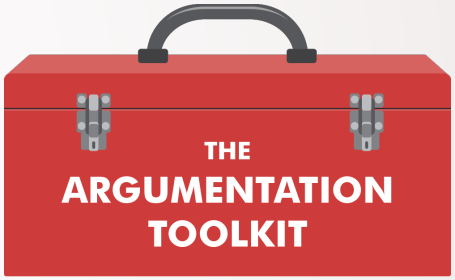

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THE ARGUMENTATION TOOLKIT

PARTNERS AND RECOGNITION

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