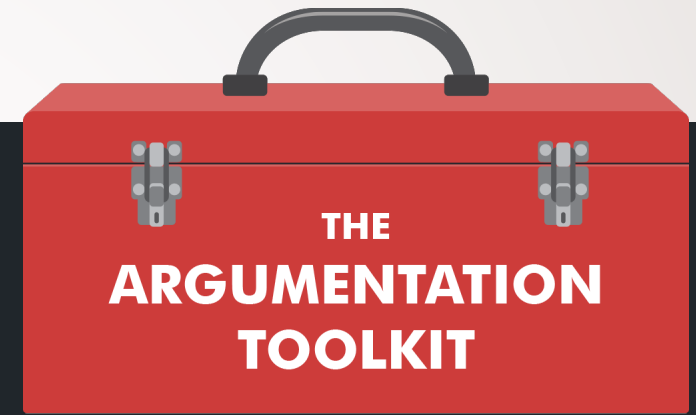


The PowerPoint and handouts for today's workshop can be found at **argumentationtoolkit.org** under the “About” tab

Engaging in scientific argumentation: How do I support my students in articulating their reasoning?



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Funding provided by
National Science Foundation

NSF DRL-1119584

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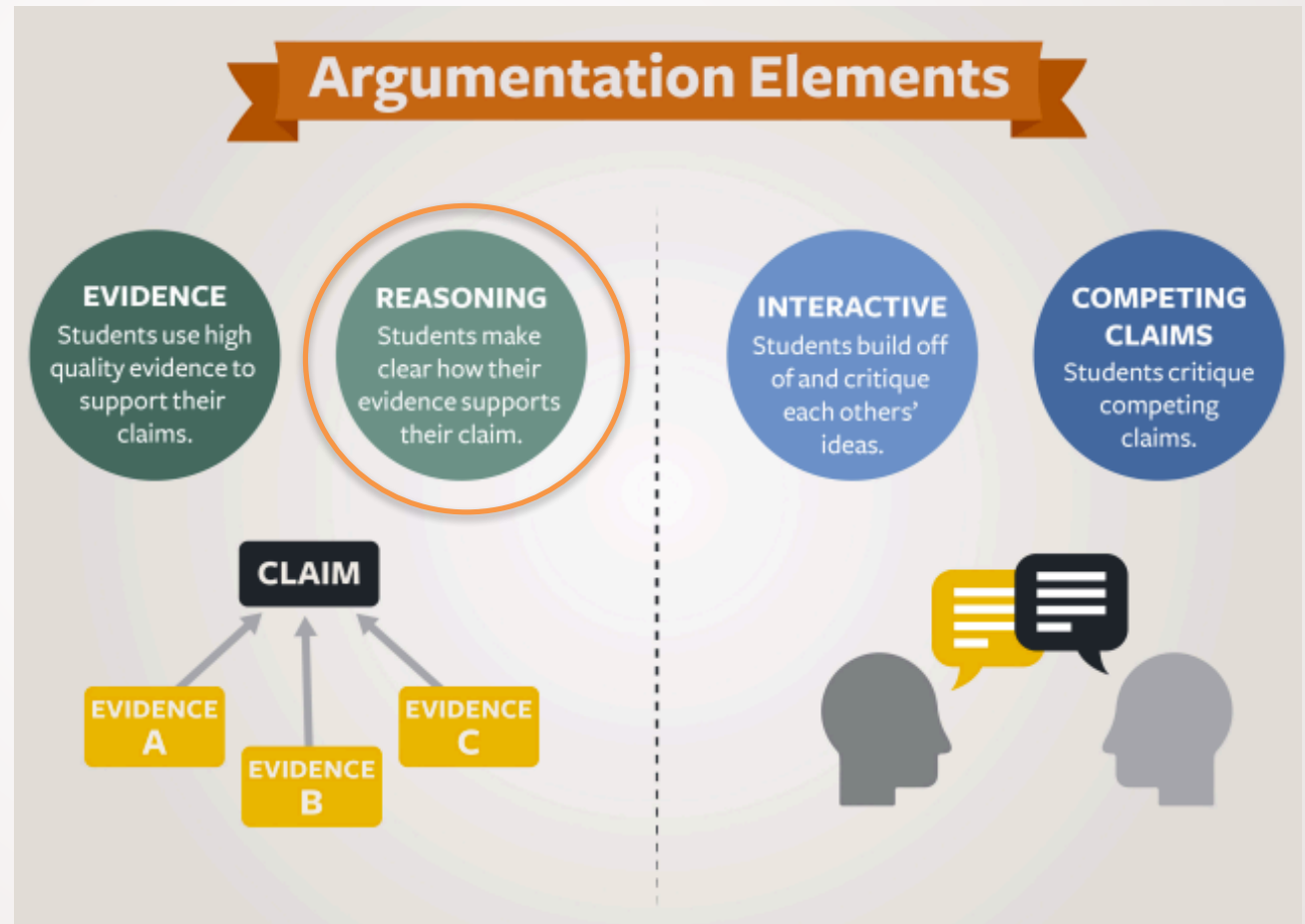
Agenda

1. Overview of the Session and Argumentation
2. Activity: Analyzing Student Writing
3. Video & Discussion: Using the Reasoning Tool
4. Activity: Anticipation Guide
5. Using the Learning Modules in the Argumentation Toolkit

The PowerPoint and handouts used during today's workshop can be found at argumentationtoolkit.org under the “About” tab

1. Overview of the Session and Argumentation

What does it mean
to engage in
argumentation?



2. Activity: Analyzing Student Writing

The task:

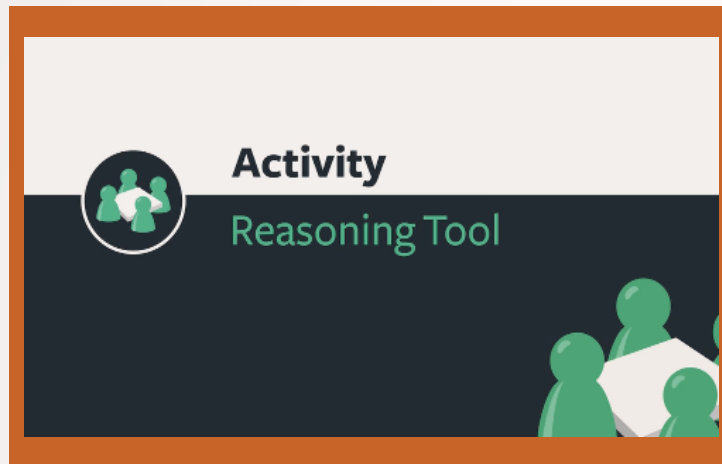
- Read through the students' writing and underline the reasoning in each argument
- Rank the sample student writing from strongest (1) to weakest (4)
- Once you have completed the task, share and discuss your ranking with another person



Discussion about Writing Analysis

- How did people rank the student writing?
Why?
- What were some of the strengths and weaknesses of the student work?
- How is this similar and different from what you observe in your own students' work?

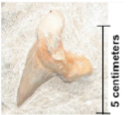
3. Video & Discussion: Using the Reasoning Tool



We are going to watch a video that provides an introduction to the reasoning tool

Discussion Question:

- How could the reasoning tool support the challenges we just observed in the student writing? Why?
- How could you envision using the reasoning tool to support your students in articulating their reasoning?

Evidence	This evidence matters because...	Therefore...
The fossil tooth is sharp.		The fossil tooth came from a prehistoric shark, which is related to sharks that live today. 
The fossil tooth was found in sandstone, which is a type of sedimentary rock.		

4. Activity: Anticipation Guide

- An Anticipation Guide is an instructional tool that supports students in tracking their thinking, and revising claims given new evidence
- There are three steps students carry out when using an Anticipation Guide:
 1. Agree/disagree with given claims
 2. Evaluate new evidence
 3. Revise claims (if necessary) given new evidence

4. Activity: Anticipation guide Part 1

The Task:

- Read each of the claims in the anticipation guide and check whether or not you agree with them in the “Before” column.
- When you are done, share your current thinking with a partner. Remember, it is okay to be unsure at this point because you will be able to revise your thinking once you examine new evidence.

Designing Rich Argumentation Tasks [argumentationtoolkit.org] – Anticipation Guide

Anticipation Guide – What are fossils?

Directions:

- Read the claims below. If you agree with a claim, write an *A* in the “Before” column. If you disagree with a claim, write a *D* in the “Before” column.
- You will return to these claims later in the session. At that time, you will think about whether you still agree or disagree with each claim (writing your decision in the “After” column). If you disagree with the claim, you will write a revised claim in the space provided. You will also include evidence that supports all of these claims.

Before	Claim	After
	1. Fossils are footprints made by dinosaurs. Revised claim: Evidence:	
	2. Plants do not leave fossils. Revised claim: Evidence:	
	3. Fossils are all shapes and sizes. Revised claim: Evidence:	
	4. Fossils can only be made by organisms that lived on land. Revised claim: Evidence:	
	5. While some fossils are of the actual body of an organism, others are impressions left by the organisms. Revised claim: Evidence:	

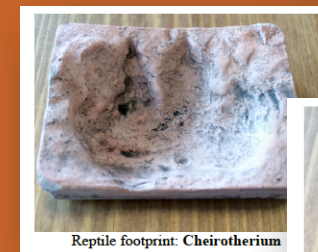
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4. Activity: Examining new evidence

The Task:

- Work in pairs or small groups to examine the Fossil Evidence Cards, keeping in mind the claims from the anticipation guide.
- When you are done, discuss how your understanding of fossils has changed, or deepened after examining the cards.



4. Activity: Anticipation guide Part 2

The Task:

- Re-read each claim, check whether or not you agree with it in the “After” column, and revise the claim (if needed) given the fossil evidence just examined.
- Make sure to add evidence in support of each claim, regardless of whether or not you revised the claim.

Designing Rich Argumentation Tasks [argumentationtoolkit.org] – Anticipation Guide

Anticipation Guide – What are fossils?

Directions:

- Read the claims below. If you agree with a claim, write an *A* in the “Before” column. If you disagree with a claim, write a *D* in the “Before” column.
- You will return to these claims later in the session. At that time, you will think about whether you still agree or disagree with each claim (writing your decision in the “After” column). If you disagree with the claim, you will write a revised claim in the space provided. You will also include evidence that supports all of these claims.

Before	Claim	After
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	5. While some fossils are of the actual body of an organism, others are impressions left by the organisms. Revised claim: Evidence:	

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Discussion about the anticipation guide

- How can an anticipation guide help students articulate their reasoning? Why?
- How can you envision your students engaging in this activity? What would work well? What challenges would they have?



5. Using the Learning Modules in the Argumentation Toolkit



5. Using the Learning Modules in the Argumentation Toolkit



The screenshot shows the homepage of 'The Argumentation Toolkit'. The header has a dark blue background with the title 'The Argumentation Toolkit' in white. Below the header is a navigation bar with links: Home (highlighted in a teal box), Intro, Argument Elements, Resources, Teacher Learning, and About. An orange arrow points to the 'Teacher Learning' link. A dropdown menu is open under 'Teacher Learning', listing: Introductory Module > Session 1, Advanced - Science Seminar > Session 2, Advanced - Designing Rich Tasks > Session 3, and Advanced - Evidence and Reasoning > Session 4. The main content area has a light beige background. On the left, it says 'Building a Culture of Argumentation' in bold red text, followed by a paragraph: 'The Argumentation Toolkit is a collection of resources designed to help teachers understand and teach scientific argumentation.' and a 'Learn More' button. On the right, there is a graphic with colorful circles and a red box labeled 'ARGUMENTATION TOOLKIT'. At the bottom, there is a graphic of three people sitting at a table and a group of people standing.

The Argumentation Toolkit

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

- Introductory Module > Session 1
- Advanced - Science Seminar > Session 2
- Advanced - Designing Rich Tasks > Session 3
- Advanced - Evidence and Reasoning > Session 4

Building a Culture of Argumentation

The Argumentation Toolkit is a collection of resources designed to help teachers understand and teach scientific argumentation.

[Learn More](#)

ARGUMENTATION TOOLKIT



5. Using the Learning Modules in the Argumentation Toolkit

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
<ul style="list-style-type: none">• Introductory Module on Scientific Argumentation	<ul style="list-style-type: none">• 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)
<ul style="list-style-type: none">• Advanced Module - Science Seminar	<ul style="list-style-type: none">• Goal - Introduces the science seminar, an argumentation activity.• DCI - Earth science focused on weather (MS-ESS2-5) and climate (MS-ESS2-6)
<ul style="list-style-type: none">• Advanced Module - Designing Rich Argumentation Tasks	<ul style="list-style-type: none">• 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)
<ul style="list-style-type: none">• Advanced Module - Evidence and Reasoning	<ul style="list-style-type: none">• 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).



5. Using the Learning Modules in the Argumentation Toolkit

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.

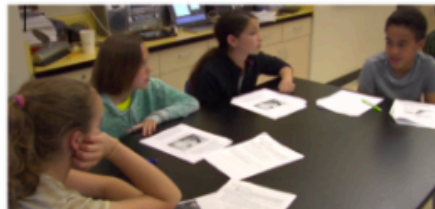
Session Name	Description	Length
Session #1: What is the role of evidence in a scientific argument?	This session introduces the four areas of argumentation that students need extra support in, and then focuses specifically on the role of evidence.	45 minutes
Session #2: How does considering competing 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



5. Using the Learning Modules in the Argumentation Toolkit

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
<ul style="list-style-type: none">What is the role of evidence in a scientific argument?	<ul style="list-style-type: none">Evidence	<ul style="list-style-type: none">Card Sort
<ul style="list-style-type: none">How does considering competing claims support students' use of evidence and reasoning?	<ul style="list-style-type: none">Competing Claims	<ul style="list-style-type: none">Card Sort
<ul style="list-style-type: none">What is the role of reasoning in a scientific argument?	<ul style="list-style-type: none">Reasoning	<ul style="list-style-type: none">Reasoning Tool, Student Writing



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](#)

Takeaways from this Workshop

Reasoning explains how evidence supports a claim, often incorporating science ideas and concepts

Encouraging students to write and talk about reasoning supports them in building understandings of the science concept

Including reasoning makes an argument more convincing

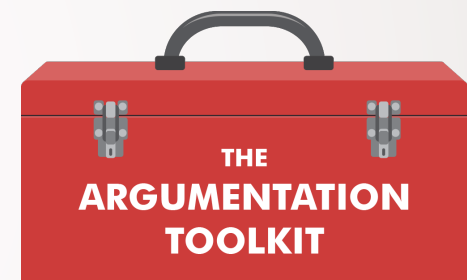
A Reasoning Tool and an Anticipation Guide support students with reasoning across writing and speaking



Questions and Contact Information

Questions???

argumentationtoolkit.org

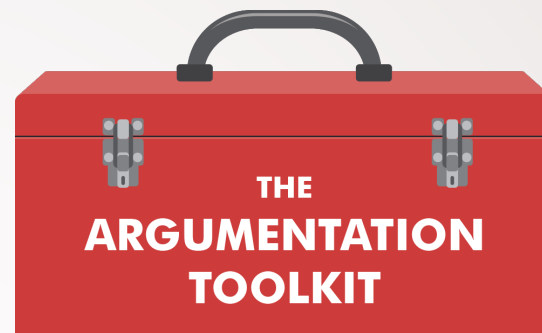


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The Learning Design Group



PARTNERS AND RECOGNITION



Developed in collaboration
with Boston College



Funding provided by
National Science Foundation

NSF DRL-1119584

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