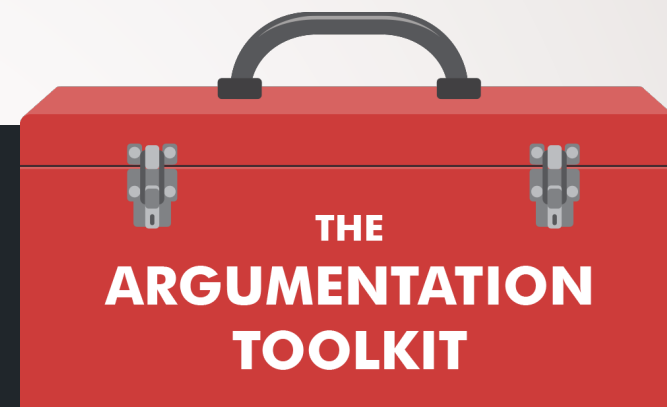The PowerPoint and handouts for today's workshop can be found at **argumentationtoolkit.org** under the "About" tab

The Argumentation Toolkit: Multimedia Resources for Supporting Students in Talking About Their Evidence and Reasoning

María González-Howard, University of Texas at Austin
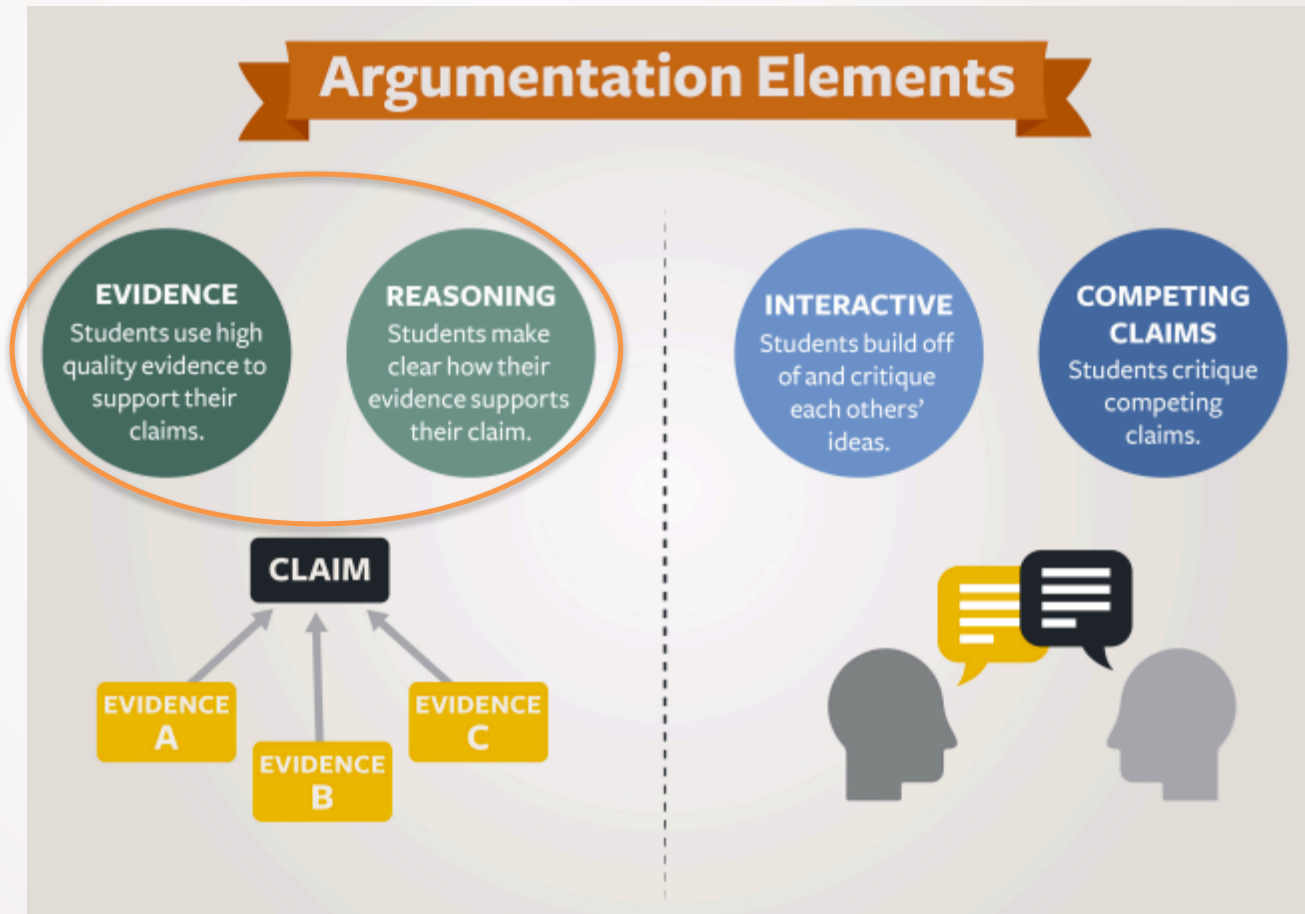
THE ARGUMENTATION TOOLKIT

Agenda

1. Overview of the Session and Argumentation
2. Video & Discussion: Using the Evidence Gradient Tool
3. Activity: Evaluating Evidence with the Evidence Gradient Tool
4. Activity: Discussing Reasoning through an 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?

Video & Discussion: Using the Evidence Gradient Tool

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

Discussion Questions:

- What challenges have you experienced, or could you imagine experiencing, supporting your students in evaluating the quality of evidence?

- How could you envision using the evidence gradient tool to support your students in assessing and articulating the quality of evidence?

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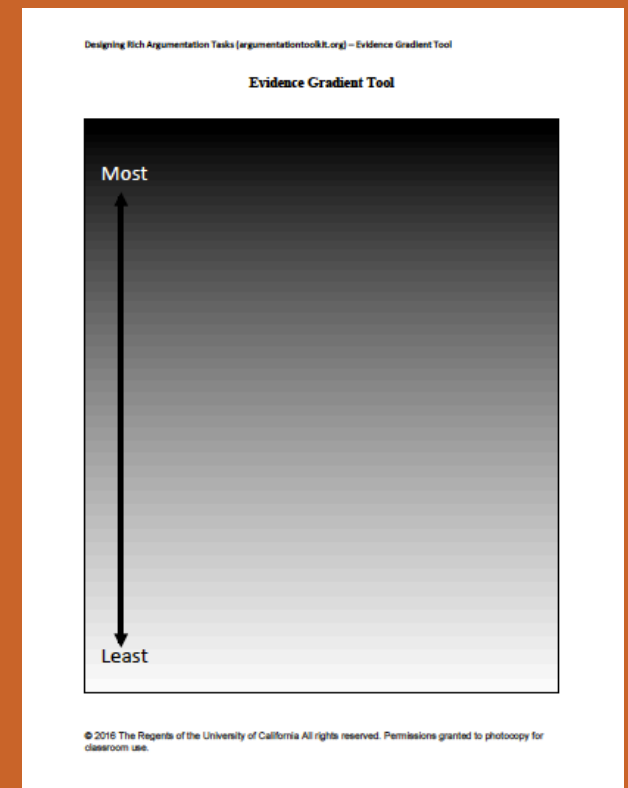# Activity: Evaluating evidence with the Evidence Gradient Tool

Before conducting this activity, consider and discuss the following questions:

- What are sources you would trust to provide high quality evidence? Why would you trust these sources?

- What are sources you would not trust to provide high quality evidence? Why would you not trust these sources?

Activity: Evaluating evidence with the Evidence Gradient Tool
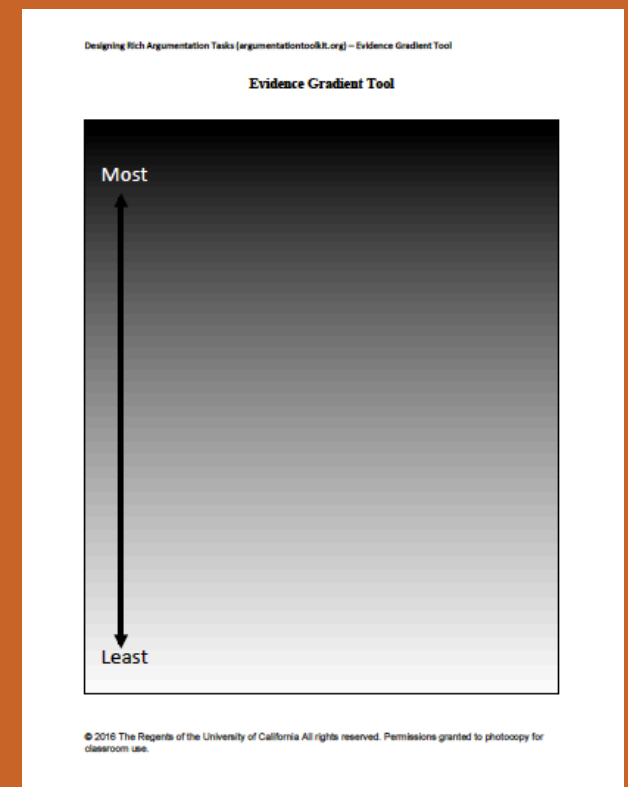
The Task (Part 1):

- Use the Evidence Gradient Tool to sort the possible evidence cards according to their source. Place those that are of higher quality at the top of the Gradient Tool, and those that are of lower quality at the bottom

- Make sure you articulate *why* you rank cards as you do

- Once you have completed the task, share your work with another group and discuss any disagreements you may have

Evidence Gradient Tool

Most

Least

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Activity: Evaluating evidence with the Evidence Gradient Tool

The Task (Part 2):

- Eliminate cards that you ranked of low quality in terms of source

- Use the Evidence Gradient Tool to rank the remaining evidence cards in terms of how well they support the claim – <u>Ocean currents impact baby American eels' chances of survival</u>. Place those that best support the claim at the top of the gradient tool, and those that support it least at the bottom

- Make sure you articulate *why* you rank cards as you do

Designing Rich Argumentation Tasks (argumentationtoolkit.org) – Evidence Gradient Tool

Evidence Gradient Tool

Most

Least

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Discussion about the Evidence Gradient Tool

- What did you talk about when you were discussing the source of the possible evidence?

- Were any cards difficult to rank? Why?

- How can you envision your students engaging in this activity? What would work well? What challenges would they have?

Activity: Discussing Reasoning Through an 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

Activity: Discussing Reasoning Through an 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.

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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.

Coral: **Acervularia**

Trilobite: **Calymene**

Reptile footprint: **Cheirotherium**

Dinosaur tooth: **Albertosaurus**

Examining new evidence

Seed fern: **Neuropteris**

Ammonite: **Echioceras**

Shark tooth: **Otodus**

Coral: **Acervularia**

Dinosaur tooth: **Albertosaurus**

Shrimp: **Hefriga**

Tooth of marine reptile: **Ichthyosaur**

Sea-lily: **Gissocrinus**

Fish: **Diplomystus**

Trilobite: **Calymene**

Reptile footprint: **Cheirotherium**

Sea-urchin: **Phymosoma**

Activity: Discussing Reasoning Through an 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.

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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?

Using the Learning Modules in the Argumentation Toolkit
www.argumentationtoolkit.org

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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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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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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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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

Evidence is observations about the natural world that is used to support claims

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

Encouraging students to talk about evidence and reasoning help them build understandings of the science concept
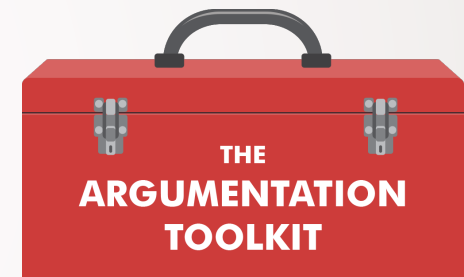
An Evidence Gradient Tool and an Anticipation Guide support students in talking about their evidence and reasoning

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Questions and Contact Information

Questions???

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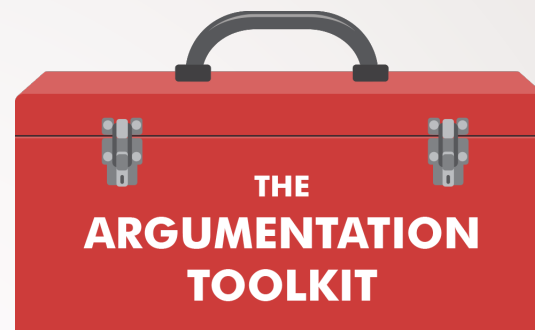
PARTNERS AND RECOGNITION

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