

Designing Rich Argumentation Tasks Module

This module on designing rich argumentation tasks can be executed as four sessions that are each 45-minutes, or fewer sessions that are longer (e.g. one 3-hour session). If held as multiple sessions, the agenda includes an extension section to encourage teachers to implement some argumentation aspect before the next session. The following session then begins with time for teachers to share their experiences, as well as artifacts of their students' argumentation (e.g. writing, video). These sections are optional. If held as one session, please see the **notes in red**, which are located below the materials list and before the start of Session #4.

The agenda below contains descriptions about the various activities that make up the module, as well as estimated lengths of time for each activity.

The goals for the Designing Rich Argumentation Tasks Module include:

- Teachers will be introduced to key criteria and other things to consider when designing rich argumentation tasks.
- Teachers will consider how various instructional activities (e.g. Evidence Gradient Tool, Anticipation Guide) align with the key criteria for rich argumentation tasks.
- Teachers will be introduced to the Evidence Gradient Tool as an instructional activity that supports students in evaluating the quality of evidence.
- Teachers will be introduced to the Anticipation Guide as an instructional tool that supports students in tracking their thinking, and revising claims given new evidence.
- Teachers will consider the ways that different instructional activities can support the four areas of argumentation in which students need extra support.
- Teachers will design a new lesson or revise an existing lesson to integrate a rich argumentation task into their science instruction.
- Teachers will identify areas of argumentation that are challenging for their students.*

*Note: This final goal is only applicable if the module is implemented as multiple sessions

Materials:

- Criteria for Rich Argumentation Tasks handout (used in ALL sessions)
- Lessons with Argumentation Tasks handout (Session #1)
- Possible American Eels Evidence Cards (Session #2)
- Evidence Gradient Tool (Session #2)
- Anticipation Guide handout (Session #3)
- Fossil Evidence Cards (Session #3)
- Argumentation Activities handout (Session #3 and Session #4)*
- Argumentation Activities Planning Tool (Session #3 and Session #4)*

***Note: If held as one 3-hour session, the last two handouts should be passed out during the start of the Session #4 segment of this module.**

Session #1: What design criteria support rich argumentation tasks?

Activity	Description	Time
Video & Discussion: Designing Argumentation Tasks	<ul style="list-style-type: none"> • Introduce teachers to this module’s focus (criteria for designing argumentation tasks) by watching the extended classroom video Partner Discussion - http://www.argumentationtoolkit.org/resources.html <ul style="list-style-type: none"> ○ Before showing the video, provide teachers with the context of the video: Students in a 7th grade class used a metabolism simulation to gather data, and were considering which of two claims was better supported by their evidence. • Following the video, conduct a whole group discussion around the questions: <ol style="list-style-type: none"> 1. (If participants completed the Introductory Module) During the Introductory Module we covered four elements of argumentation that students may require extra support with. Which of these elements did you see in the video? Where did you see them? 2. What criteria do you think the teacher had in mind when designing this rich argumentation task? 3. What different criteria do you consider when designing tasks that engage students in argumentation? 	10 min.
Presentation: Criteria for Rich Argumentation Tasks	<ul style="list-style-type: none"> • Pass out the Criteria for Rich Argumentation Tasks handout. Inform teachers that they should keep this handout for future sessions, as they will use it often throughout this module. Share with teachers the criteria that rich argumentation tasks encompass. Specifically, rich argumentation tasks: <ol style="list-style-type: none"> 1. Include a clear guiding question <ol style="list-style-type: none"> a. Written so that students do not interpret it in many different ways b. The question should allow for there to be multiple ways to answer it (i.e. multiple possible claims) 2. Include multiple potential claims <ol style="list-style-type: none"> a. There needs to be evidence to support each claim – not just evidence for only one claim b. These claims might ultimately be convergent (i.e. meant to come together) or divergent (i.e. competing) 3. Necessitate the use of evidence <ol style="list-style-type: none"> a. This evidence might be first hand (measurements or observations that students have collected), or second hand data (e.g. tables, figures, charts that they are given to analyze and use) 4. Encourage student-driven argumentation 	5 min.

	<p>a. Students, not the teacher, should be leading and carrying out the argumentation task</p> <ul style="list-style-type: none"> • Explain how the key criteria unfolded in the video just watched: <ul style="list-style-type: none"> ○ Although not explicitly articulated in the video, the task was grounded in a guiding question – <i>Which option gives you more energy for exercising: 1) eating a lot of food before exercising, or 2) eating small amounts of food more frequently while exercising?</i> ○ Students considered which of two claims is better supported by their evidence: <ul style="list-style-type: none"> ▪ Abdi’s claim – Eating a lot of food before you exercise will give you more energy than eating small amounts of food during exercise ▪ Desiree’s claim – Eating small amounts of food more frequently during exercise will give you more energy than eating a lot of food before you exercise ○ Students gathered evidence from a metabolism simulation, which they needed to use to answer the guiding question ○ Students lead and carried out the argumentation task, debating over which claim was better supported by their evidence. The teacher was not involved in the task. • Direct teachers to also examine the list of “other things to consider” when designing rich argumentation tasks <p><i>Materials: Criteria for Rich Argumentation Tasks handout</i></p>	
<p>Activity: Analysis of Argumentation Task</p>	<ul style="list-style-type: none"> • Explain to teachers that they will now have an opportunity to evaluate two lessons that include argumentation tasks. Pass out the Lessons with Argumentation Tasks handout and give teachers time to read through each lesson and task. Afterwards, have teachers do a think-pair-share in which they analyze the two tasks with respect to the four key design criteria previously discussed. <p><i>Materials: Lessons with Argumentation Tasks handout</i></p>	<p>10 min.</p>
<p>Activity: Redesign of Argumentation Task</p>	<ul style="list-style-type: none"> • Have teachers redesign either the argumentation task in Lesson #1 or Lesson #2 (from the previous activity) in terms of one of the key design criteria. This might include restructuring the task completely and/or changing the data that students are using. Teachers may choose to do so individually or in pairs. • After about 10 minutes, have a few teachers share their revisions. Encourage teachers to articulate how the revisions attend to the criteria they selected. 	<p>15 min.</p>

	<ul style="list-style-type: none"> • Then, share one example of how Lesson 1 could be revised to better engage students in argumentation. For instance, there are not multiple potential claims for this lesson’s guiding question given that particular data set (i.e. Design Criteria #2). Instead: <ol style="list-style-type: none"> 1. Give students materials (e.g. batteries, nails of different materials, wire of different materials, electric tape, and paper clips) and task them with constructing the strongest electromagnet (i.e. able to pick up the most paper clips) <ol style="list-style-type: none"> a. Encourage students to consider design features such as wire material, nail material, number of wire turns around the nail, number of batteries, and the arrangement of batteries 2. Afterwards, have students engage in argumentation around the question – <i>Which design features result in the strongest electromagnet?</i> 	
<p>Extension: Analyze an Argumentation Task Within a Lesson!</p> <p>*If the module is held as multiple sessions</p>	<ul style="list-style-type: none"> • Before the next session, ask teachers to pick a lesson from existing curriculum that includes an argumentation task. Have them analyze the task with respect to the four key criteria previously discussed (similar to how they did during the Activity: Analysis of Argumentation Task). • Have teachers bring to the next meeting the lesson that they analyzed along with their notes of this evaluation. 	Optional

Session #2: How can you support students to evaluate the quality of evidence?

Activity	Description	Time
<p>Extension Discussion: Analyze an Argumentation Task Within a Lesson!</p> <p>*If the module is held as multiple sessions</p>	<ul style="list-style-type: none"> • If the “Analyze an Argumentation Task within a Lesson!” was completed, encourage teachers to share the lessons they analyzed, as well as any notes they took. Lead a discussion around the questions: <ol style="list-style-type: none"> 1. Were any of the design criteria strong in the argumentation task you analyzed? Why do you think so? 2. Were any of the design criteria weak in the argumentation task you analyzed? Why do you think so? 	Optional
<p>Video & Discussion: Using the Evidence Gradient Tool</p>	<ul style="list-style-type: none"> • Review with teachers the key criteria and other things to consider when designing rich argumentation tasks. During this time you may encourage teachers to look at the Criteria for Rich Argumentation Tasks handout that was passed out during Session #1. Inform teachers that they will be introduced to a new type of argumentation activity in this session. Mention to teachers that 	10 min.

	<p>the argumentation activities they experience in this module provide them with an opportunity to apply and discuss the design criteria. These activities can also serve as inspiration for the rich argumentation tasks they design in the final session.</p> <ul style="list-style-type: none"> • Introduce teachers to the evidence gradient tool by watching the video Activity: Evidence Gradient Tool - http://www.argumentationtoolkit.org/evidence.html • Following the video, conduct a whole group discussion around the questions: <ol style="list-style-type: none"> 1. What challenges have you experienced supporting your students in evaluating the quality of evidence? 2. What different ways could you imagine using the evidence gradient tool to help students assess the quality of evidence? • Key points to highlight during this discussion: <ul style="list-style-type: none"> ○ Evidence is observations or data about the natural world that is used to support claims ○ Some pieces of evidence can be stronger than others in support of a claim ○ Higher quality evidence makes an argument more convincing <p><i>Materials: Criteria for Rich Argumentation Tasks handout</i></p>	
<p>Activity: Evaluating Evidence with the Evidence Gradient Tool</p>	<ul style="list-style-type: none"> • Explain to teachers that the source evidence comes from is one way to decide if evidence is high quality. Before starting this activity, have teachers discuss these questions: <ol style="list-style-type: none"> 1. What are sources you would trust to provide high quality evidence? Why would you trust these sources? 2. What are sources you would not trust to provide high quality evidence? Why would you not trust these sources? • Reiterate the purpose of using the evidence gradient tool, and provide the context for this activity. Using the evidence gradient tool, have teachers first sort the possible evidence cards according to their source. Encourage teachers to articulate <i>why</i> they evaluate and arrange cards as they do. When teachers are done evaluating the cards, have them share how they ranked the cards with another group. Encourage teachers to discuss any disagreements that they may have in how they ranked the cards. • Discuss with teachers that a potential next step after students evaluate possible evidence in terms of source, is to then evaluate the higher quality cards in terms of how well they support a 	<p>25 min.</p>

	<p>particular claim. Have teachers eliminate cards that were ranked of low quality in terms of source, and then use the evidence gradient tool to rank each remaining evidence card in terms of how well it supports the claim – Ocean currents impact baby American eels’ chances of survival.</p> <ul style="list-style-type: none"> ○ Allow teachers to decide what the “low quality” cutoff point is for the cards that they choose discard ○ Depending on time, facilitate a brief conversation around how the “low quality” cutoff point is decided upon <ul style="list-style-type: none"> ● After the activity, conduct a whole group discussion around the questions: <ol style="list-style-type: none"> 1. What did you talk about when you were discussing the source of the possible evidence? 2. Where any cards difficult to rank? Why? 3. How can you envision your students engaging in this activity? What would work well? What challenges would they have? ● Key Points to highlight after the activity and discussion: <ul style="list-style-type: none"> ○ Some pieces of evidence can be stronger than others in support of a claim ○ Source of evidence can be used as a criteria for evaluating the quality of evidence <p><i>Materials: Possible American Eels Evidence Cards, Evidence Gradient Tool</i></p>	
<p>Discussion: Supporting Student Discussions about Evidence</p>	<ul style="list-style-type: none"> ● Share with teachers the list of strategies that could be used to support students’ discussions about evidence. These strategies include: <ul style="list-style-type: none"> ○ Modeling discussions using the gradient tool ○ Focusing on one criteria for high quality evidence at a time (e.g. source, manner by which data was collected) ○ Circulating the room and encouraging students to discuss the quality of evidence ○ Pausing and highlighting strong student discussions ○ Avoiding a focus on the right answers, and instead emphasizing the importance of the process ● Afterwards, conduct a whole group discussion around the questions: <ol style="list-style-type: none"> 1. Are there other strategies that you use to support student discussions around evidence? 2. What are the benefits of having your students discuss evidence? 	<p>5 min.</p>

	<p>***Note: If you would like to learn more about how to support student discussions about evidence, watch the video Strategy: Discussing the Quality of Evidence, Using the Evidence Gradient Tool – http://www.argumentationtoolkit.org/evidence.html</p>	
<p>Connection Back to Design Criteria</p>	<ul style="list-style-type: none"> • Reiterate the key criteria and other things to consider when designing rich argumentation tasks. During this time you may encourage teachers to review the Criteria for Rich Argumentation Tasks handout. • Afterwards, conduct a think-pair-share around the questions: <ol style="list-style-type: none"> 1. In the activity you just completed, which design criteria do you think the argumentation task aligned with well? 2. Which design criteria do you think the argumentation task did not align with? 3. How could you redesign the argumentation task to better align? • Discuss with teaches any suggestions they have for revisions. Bring up that this task did not have a guiding question (Design Criteria #1) nor did it have students consider multiple claims (Design Criteria #2). However, you may want to note that it may be appropriate for an argumentation task to focus on one of these criteria depending on the goal and students’ past experiences. <p><i>Materials: Criteria for Rich Argumentation Tasks handout</i></p>	<p>5 min.</p>
<p>Extension: Try it With Your Students!</p> <p>*If the module is held as multiple sessions</p>	<ul style="list-style-type: none"> • Before the next session, ask teachers to develop or revise an argumentation task within a lesson to encourage students to evaluate the quality of evidence. This task could include using the evidence gradient tool or it could be another type of activity. <ul style="list-style-type: none"> ○ Remind teachers to consider the key design criteria when completing this task • Have teachers bring to the next meeting the argumentation task that they developed, as well as potentially student artifacts or a video clip of students engaged in this. 	<p>Optional</p>

Session #3: How can you support students to revise their thinking given new evidence?

Activity	Description	Time
<p>Extension Discussion: Try it With</p>	<ul style="list-style-type: none"> • If the “Try out With Your Students!” was completed, encourage teachers to share the argumentation tasks they developed, as well as any student artifacts they may have. Lead a discussion around the 	<p>Optional</p>

<p>Your Students!</p> <p>*If the module is held as multiple sessions</p>	<p>questions:</p> <ol style="list-style-type: none"> 1. What went well with the argumentation task? Why do you think this went well? 2. What was challenging with the argumentation task? Why do you think it was challenging? 	
<p>Video & Discussion: Using an Anticipation Guide</p>	<ul style="list-style-type: none"> • Review with teachers the key criteria and other things to consider when designing rich argumentation tasks. During this time you may encourage teachers to look at the Criteria for Rich Argumentation Tasks handout that was passed out during Session #1. Inform teachers that they will be introduced to a new type of argumentation activity in this session. Mention to teachers that the argumentation activities they experience in this module provide them with an opportunity to apply and discuss the design criteria. These activities can also serve as inspiration for the rich argumentation tasks they design in the final session. • Introduce teachers to the Anticipation Guide by watching the video Strategy: Revising Claims, Using the Anticipation Guide - http://www.argumentationtoolkit.org/competing-claims.html • Following the video, conduct a whole group discussion around the questions: <ol style="list-style-type: none"> 1. In what ways does an anticipation guide mirror the work of scientists? 2. How might an anticipation guide support deeper learning for students? • Key points to highlight during this discussion: <ul style="list-style-type: none"> ○ Encourage students to revise their thinking as new evidence arises ○ An anticipation guide is a tool for helping students track their thinking, and revise claims given new evidence <p><i>Materials: Criteria for Rich Argumentation Tasks handout</i></p>	<p>10 min.</p>
<p>Activity: Anticipation Guide Part 1</p>	<ul style="list-style-type: none"> • Pass out the Anticipation Guide handout. Have teachers read each of the claims and check whether or not they agree with them in the “Before” column. • Claims include: <ul style="list-style-type: none"> ○ Fossils are footprints made by dinosaurs. ○ Plants do not leave fossils. ○ Fossils are all shapes and sizes. ○ Fossils can only be made by organisms that lived on land. ○ While some fossils are of the actual body of an organism, others are impressions left by the organism. 	<p>5 min.</p>

	<ul style="list-style-type: none"> • Prompt teachers to share their current thinking with a partner, emphasizing that it is okay to be unsure at this point because they will be able to revise their thinking (and the claims) once they examine new evidence. <p><i>Materials: Anticipation Guide handout</i></p>	
Activity: Examining New Evidence	<ul style="list-style-type: none"> • Pass out the Fossil Evidence Cards and have teachers examine them. Encourage participants to keep in mind the claims from the Anticipation Guide as they look through the cards. Have teachers work in pairs or small groups to complete this task. • Then, have teachers talk with another pair or group about how their understanding of fossils has changed, or deepened, after examining the cards. <p><i>Materials: Fossil Evidence Cards</i></p>	10 min.
Activity: Anticipation Guide Part 2	<ul style="list-style-type: none"> • Have teachers re-read each of the claims, write whether they agree or disagree with them in the “After” column, and revise (if needed) given the new evidence they gathered from examining the Fossil Evidence Cards. <ul style="list-style-type: none"> ○ They should rewrite their claims in the area labeled “Revised Claim” ○ Encourage teachers to add evidence in support of each claim. They should do so regardless of whether or not they revised the claim. • Afterwards, facilitate a whole group discussion around the following questions: <ol style="list-style-type: none"> 1. Were there any claims that you found difficult to revise? Why? 2. How can you envision your students engaging in this activity? What would work well? What challenges would they have? <p><i>Materials: Anticipation Guide handout, Fossil Evidence Cards</i></p>	15 min.
Connection Back to Design Criteria	<ul style="list-style-type: none"> • Reiterate the key criteria and other things to consider when designing rich argumentation tasks. During this time you may encourage teachers to review the Criteria for Rich Argumentation Tasks handout. • Afterwards, conduct a think-pair-share around the questions: <ol style="list-style-type: none"> 1. In the activity you just completed, which design criteria do you think the argumentation task aligned with well? 2. Which design criteria do you think the argumentation task 	5 min.

	<p>did not align with?</p> <p>3. How could you redesign the argumentation task to better align?</p> <ul style="list-style-type: none"> • Discuss with teaches any suggestions they have for revisions. You may want to note that it may be appropriate for an argumentation task to focus on one of these criteria depending on the goal and students’ past experiences. <p><i>Materials: Criteria for Rich Argumentation Tasks handout</i></p>	
<p>Extension: Preparation for Work Session</p> <p>*If the module is held as multiple sessions</p>	<ul style="list-style-type: none"> • For the next meeting, ask teachers to bring a lesson with an argumentation task from existing curriculum that they would like to revise. This could be the lesson they examined for the extension activity of Session #1. • Pass out the Argumentation Activities handout, and the Argumentation Activities Planning Tool. Before the next meeting, ask teachers to look through the planning tool and mark which argumentation element they would highlight for each activity. Encourage them to review the Argumentation Activities handout if they need a reminder of what each activity entails. <ul style="list-style-type: none"> ○ Tell teachers to keep the various activities in mind, as they could incorporate one into the lesson they choose to revise <p><i>Materials: Argumentation Activities handout, Argumentation Activities Planning Tool</i></p>	Optional

***Note:** If the module is held as one session, teachers should bring an existing curriculum or lesson with an argumentation task to the session to analyze and revise (if time permits). Instead of conducting Session #4 as written, teachers should be given time to analyze an argumentation task within an existing lesson with respect to the key design criteria (see extension in Session #1, and extension discussion in Session #2); and time to look through and discuss the Argumentation Activities handout and Argumentation Activities Planning Tool (see extension in Session #3, and extension discussion in Session #4). Afterwards, if time allows, have teachers begin designing or revising a lesson to better integrate a rich argumentation task.

Session #4: Work session - designing a rich argumentation task

Activity	Description	Time
Extension Discussion: Preparation for Work Session	<ul style="list-style-type: none"> • If the “Preparation for Work Session” was completed, have teachers share how they marked the Argumentation Activities Planning Tool. Encourage teachers to explain the rationales for their decisions. <ul style="list-style-type: none"> ○ Emphasize that there is no “right” answer for how this 	Optional

<p>*If the module is held as multiple sessions</p>	<p>planning tool should be marked. Instead, it is important for teachers to build a repertoire of instructional approaches for supporting students across the different argumentation elements.</p> <ul style="list-style-type: none"> • Afterwards, lead a discussion around the questions: <ol style="list-style-type: none"> 1. Was any activity challenging to mark in terms of the argumentation element you would highlight? Why do you think it was challenging? 2. Are there any other activities you have used to support student engagement in argumentation? What are they, and which argumentation element(s) do they target? <p><i>Materials: Argumentation Activities handout, Argumentation Activities Planning Tool</i></p>	
<p>Review of Resources for Design Task</p>	<ul style="list-style-type: none"> • Review with teachers the key criteria and other things to consider when designing rich argumentation tasks. During this time you may encourage teachers to look at the Criteria for Rich Argumentation Tasks handout that was passed out during Session #1. <ul style="list-style-type: none"> ○ Inform teachers that they should keep these design criteria in mind as they work to revise a lesson to include a rich argumentation task. • Encourage participants to also use the Argumentation Activities handout and the Argumentation Activities Planning Tool as resources while they work to redesign a lesson. <p><i>Materials: Criteria for Rich Argumentation Tasks handout, Argumentation Activities handout, Argumentation Activities Planning Tool</i></p>	<p>5 min.</p>
<p>Activity: Work Time</p>	<ul style="list-style-type: none"> • Give teachers work time to design a new lesson or revise an existing lesson to integrate a rich argumentation task into their science instruction. <ul style="list-style-type: none"> ○ Teachers may choose to do this design task individually, in pairs, or in small groups. If teachers want to work with colleagues, this grouping could be organized in many ways, such as the argumentation activity they want to focus on (e.g. anticipation guide), grade level they teach, or science content in their current unit (e.g. force and motion). ○ Mention to teachers that they can incorporate an argumentation activity they experienced in this module into their lesson, such as an evidence gradient tool or an anticipation guide. However, teachers should be intentional about adapting these argumentation activities so that the content in them aligns with the targeted content. For instance, it would not be productive to use the exact 	<p>25 min.</p>

	<p>anticipation guide teachers experienced in Session #3 if the content being targeted in their curriculum is space science.</p> <ul style="list-style-type: none"> ○ *Teachers should bring any materials they will need to engage in this activity to the session (e.g. personal computers, curriculum) 	
<p>Activity: Share Out</p>	<ul style="list-style-type: none"> ● Have a few teachers share out their lesson redesigns, focusing on the rich argumentation task they integrated into the lesson. Encourage them to explain what they changed, as well as why they felt these changes were necessary. <ul style="list-style-type: none"> ○ Prompt teachers to consider the key design criteria when they discuss the rationale behind their revisions ● Afterwards, facilitate a whole group discussion around the following questions: <ol style="list-style-type: none"> 1. Did anyone hear an argumentation task they liked and would like to keep in mind for their own instruction? 2. What did you find challenging about designing or revising a lesson to include a rich argumentation task? 	<p>10 min.</p>
<p>Takeaways from the Module</p>	<ul style="list-style-type: none"> ● Reiterate the key points from this module: <ul style="list-style-type: none"> ○ Rich argumentation tasks: 1) include a clear guiding question, 2) include multiple potential claims, 3) necessitate the use of evidence and 4) encourage student-driven argumentation ○ It is important to build a repertoire of instructional activities (e.g. evidence gradient tool, anticipation guide) for supporting students across different argumentation elements ○ Existing curricula can be revised to better integrate rich argumentation tasks 	<p>5 min.</p>