



Claim-Evidence-Reasoning: Grades 3–5

OVERVIEW:

To learn to think like a scientist, students must draw and explain conclusions and use reasoning and evidence to support their thinking. Argumentation is a key part of science as students learn to understand the world around them and develop explanations for phenomena or solutions to problems. Argumentation is practice that brings clarity to an idea, explanation, or solution. The following lessons are designed to support students as they learn to develop a strong claim, support that claim with evidence, and compare arguments by evaluating the evidence and reasoning.

Mini-Lesson I

Developing Academic Vocabulary (15 minutes)

Background: Developing a common vocabulary and understanding of the components of a scientific argument is the first step in learning how to use the claims-evidence-reasoning model. The following lesson introduces students to the terms by using real-world examples before connecting those terms to an example within a scientific concept.

- Emphasize for students that one of the major goals of scientists and engineers is to develop evidence-based conclusions and explanations and then communicate those findings in order to work toward solutions. Share that communicating with colleagues and sharing findings is essential to the scientific community.
- Explain to students that they will learn a method known as Claim-Evidence-Reasoning to communicate their scientific findings.
- Introduce the process by showing students a commercial, advertisement, or image that allows students to make a claim to answer a question. Using a piece of media with which students are familiar enhances the real-world connection and application of a scientific argument. Consider the following steps, collaboratively building a [Claim-Evidence-Reasoning anchor chart](#):
 - Introduce the commercial or advertisement and pose a debatable question.
 - As students watch the video or study the advertisement, they should consider the question.
 - Students work with a partner to answer the question and then share their responses with the class. Synthesize responses to model how to phrase a strong claim.
 - Add the claim to the anchor chart, providing a definition and emphasizing the example.



- Invite students to turn and talk to discuss the evidence in the commercial, advertisement, or video that supports their claim.
 - Introduce and add evidence to the anchor chart. Share the definition and utilize evidence you heard students share to provide an example.
 - Emphasize that evidence must be specific data or information that relates to the claim.
- Invite students to choose one of the pieces of evidence and turn and talk to explain how or why the evidence supports the claim.
 - Introduce and add their reasoning to the anchor chart. Share the definition and synthesize student discussions to connect the evidence to the claim.
 - Emphasize that in science, the reasoning includes the scientific principle or rule.
- Once students have been introduced to the terms and the anchor chart is created, invite them to practice using an example from a science lesson. The following is based on the bar graph “Comparing Conditions” found on page 4-Build in the *Expedition: Learn!* lesson “Plant Growth and the Environment.”
 - Display the bar graph and invite students to study the graph to determine what it shows.
 - Pose the following question: “Which fertilizer has more nutrients?”
 - Invite students to share their responses. Synthesize and reinforce that the answer to this question is their claim.
 - *Fertilizer B has more nutrients than fertilizer A.*
 - Remind students that strong scientific claims are based on evidence. Reinforce that evidence can be information from readings, experiments, or observations, but it needs to be scientific data related to the claim. For example:
 - *The bar graph shows that plant B grew faster than plant A.*
 - *At the end of the experiment, plant B is taller than plant A.*
 - Share with students that the last step of writing their scientific response is to explain how the data connects to their claim. Reinforce that they should include the scientific rule or principle that supports their analysis. For example:
 - *Plants need nutrients, sunlight, and water to grow. Since plants A and B received the same amount of sunlight and water, the only variable was the fertilizer. Each time data was collected, plant B was growing faster than plant A. At the end of the testing period, plant B was taller than plant A. Therefore, fertilizer B contains more nutrients to support plant growth than plant A.*
- Emphasize for students how the evidence and reasoning strengthen their claim and help prove their findings.

Mini-Lesson II

Teaching the Steps of C-E-R (20 minutes)

Background: Most young students are curious and naturally embrace the scientific thinking skills of observing phenomena and answering questions. However, many students have trouble articulating their conclusions. While they can state what is happening, they often experience difficulty explaining how or why. With explicit instruction, guided practice, and scaffolds provided in this mini-lesson, students can develop their scientific reasoning and writing skills.

- Remind students that scientists’ goal is to share their findings with the scientific community. Emphasize that scientists seek answers to explain how and why the world works as it does.
- Display the [Claim-Evidence-Reasoning anchor chart](#) and review each of the terms.
- Display and distribute a copy of the [Using Claim-Evidence-Reasoning graphic organizer](#). Use the organizer to introduce and model the steps of the C-E-R process. For example:
 - Begin the lesson by showing students an image of a shark or a headline about a shark attack. Pose the following question, sharing that they will answer the question and create an argument using the C-E-R method. Invite students to record the question on their organizer.
 - Are sharks a danger to people swimming in the oceans?

- Reinforce for students that evidence, data, and information is used to help them develop their claim. Display and share the following data about sharks and shark attacks.
 - Some sharks live in aquariums.
 - There are over 300 species of sharks. Only about 12 of those species have been involved in attacks.
 - Surfers have seen sharks.
 - According to the Florida Museum of Natural History, in 2023 there were 69 unprovoked shark attacks.
 - Non-profit group Save the Sharks reports the chance of being attacked by a shark as 1 in 11.5 million.
 - Sharks have over 300 teeth.
 - Invite students to turn and talk to share their claim to the question. After discussing, students should record their claim on their organizer. For example:
 - *Sharks are not a danger to people swimming in the ocean.*
 - *Sharks are a danger to people swimming in the ocean.*
 - Draw students' attention to the next step in the process: evidence. Reinforce that a strong claim is supported by evidence. Model how to develop a statement that supports the claim. For example:
 - *According to the organization Save the Sharks, the chance of being attacked by a shark is 1 in 11.5 million.*
 - *Evidence shows that of the 300 species of sharks, only about 12 have been known to bite a human.*
 - Invite students to use the sentence stems to record the evidence that supports their claim.
 - Introduce the final step of the process: reasoning. Emphasize that reasoning links the evidence to the claim. Model how to develop a sentence that connects the evidence to your claim. For example:
 - **Evidence statement:** *According to the organization Save the Sharks, the chance of being attacked by a shark is 1 in 11.5 million.*
 - **Reasoning:** *This confirms that sharks are not a danger to people because the chances of being bit a shark is very low. Only one person out of every 11.5 million swimmers is attacked.*
 - Invite students to use the sentence stems to write a sentence or two that explains how their evidence connects to their claim.
- Debrief, asking students to put all the information together and read their C-E-R paragraph.
 - Allow students to practice using C-E-R as they engage the lessons and readings in *Expedition: Learn!*

Mini-Lesson III

Applying C-E-R to *Expedition: Learn!*

Background: Once students have been introduced to the language and steps of the Claim-Evidence-Reasoning process, they should be provided with ample opportunities to engage with the model to develop their scientific thinking and writing skills. Any of the science lessons in *Expedition: Learn!* provide students with opportunities to practice as they are introduced to a scientific problem or phenomenon and provided with data and information to help them formulate an answer. Consider providing students with the [Claim-Evidence-Reasoning graphic organizer](#) while they engage with the lesson to help them keep track of evidence and develop a claim. After reading, they can complete the organizer based on what they learned in the lesson.

Check for Understanding

If you observe ...**Then try ...**

students having trouble developing a claim

having students sort the evidence into categories such as “for,” “against,” and “not relevant.” After students sort the evidence, they can see which position is better supported

students having trouble connecting their evidence to their claim

provide the following sentence frame:

- sentence stem + restate a portion of the claim + explain what evidence shows = reasoning



Claim-Evidence-Reasoning

<p>Claim</p> 	<p>a statement that answers a scientific question or problem</p>
<p>Evidence</p> 	<p>the scientific data that supports the claim</p>
<p>Reasoning</p> 	<p>explains how and why the evidence supports the claim</p>



Using Claim-Evidence-Reasoning

<div data-bbox="159 394 354 571"></div> <div data-bbox="162 613 747 892"><p>What is the question or problem?</p></div> <div data-bbox="162 924 747 1207"><p>[Dashed box for notes]</p></div>	<div data-bbox="812 394 1006 571"></div> <div data-bbox="1055 451 1234 514"><p>Claim</p></div> <div data-bbox="1266 409 1380 514"></div> <div data-bbox="803 613 1388 892"><p>A statement that answers the question.</p></div> <div data-bbox="803 924 1388 1207"><p>[Dashed box for notes]</p></div>
<div data-bbox="159 1249 354 1428"></div> <div data-bbox="373 1312 625 1375"><p>Evidence</p></div> <div data-bbox="641 1249 747 1386"></div> <div data-bbox="162 1480 747 1753"><p>Data, observations, and information that support your claim.</p><p>Sentence Stems: For example... Evidence that supports my claim is... According to...</p></div> <div data-bbox="162 1785 747 2068"><p>[Dashed box for notes]</p></div>	<div data-bbox="812 1249 1006 1428"></div> <div data-bbox="1023 1312 1307 1375"><p>Reasoning</p></div> <div data-bbox="1282 1228 1404 1365"></div> <div data-bbox="803 1480 1388 1753"><p>How does the evidence support your claim?</p><p>Sentence Stems: This confirms... Since... In conclusion...</p></div> <div data-bbox="803 1785 1388 2068"><p>[Dashed box for notes]</p></div>



Claim-Evidence-Reasoning

Topic/Title of Lesson: _____

Claim



Evidence



Sentence Stems:

- For example...
- Evidence that supports my claim is...
- According to...

Reasoning



Sentence Stems:

- This confirms...
- Since...
- In conclusion...