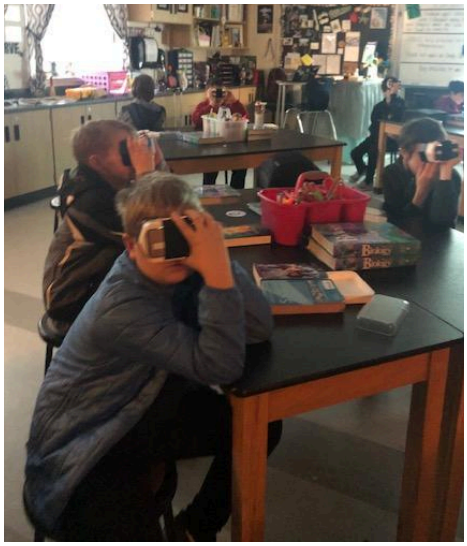
Final Explanation - Teacher Guide



Setting the Stage

In this lesson, students work independently to incorporate concepts and evidence acquired during the Arctic Feedbacks unit into a written final explanation for the unit driving question, “Why might the Arctic be warming four times as fast as the rest of the world?”

Lesson Overview

- *Part 1 – (60-90 minutes) Final Explanation*
  Students work independently to write their final explanations for the unit driving question,“Why might the Arctic be warming four times as fast as the rest of the world?

The materials were developed by CIRES Education and Outreach at CU Boulder with support from AGS 1554659 and OPP 1839104.

Instructional Overview	
Grade Level	Middle/High School
Instructional Time	60-90 minutes
Standards Alignment	**NGSS Disciplinary Core Ideas:** • **ESS2.A: Earth Materials and Systems** • **ESS2.D: Weather and Climate** **NGSS Science and Engineering Practices:** • Constructing Explanations
Unit Driving Question	• Why might the Arctic be warming four times as fast as the rest of the world?
Driving Question(s) For This Lesson	• Why might the Arctic be warming four times as fast as the rest of the world?
Learning Goals	• Construct a written explanation for the unit driving question, "why might the Arctic be warming four times as fast as the rest of the world?"
Materials	❏ Final Explanation PPT ❏ Rubric (1 per student) ❏ Final models (developed in previous lesson) ❏ Lined paper or computers for final explanation (1 per student) ❏ Gotta-Have Checklist ❏ Summary Table
Material Preparation	❏ Print Rubric ❏ Review presenter notes in the Final Explanation PPT ❏ See Gotta-Have Checklist example ❏ See Final Summary Table example ❏ See Final Explanation examples ❏ Make sure each student has a copy of the Final Model they developed in the previous lesson to refer to when writing their final explanation ❏ Display gotta-have checklist and final summary table
Vocabulary	• No new vocabulary

Part 1 - Final Explanation (60-90 minutes)

Refer to Part 1 slides included in the Final Explanation PPT. See PPT presenter notes for additional information.

1. Provide students with instructions for writing their final explanation by referring to the Final Explanation PPT.
    a. Teacher Tips:
        i. Read the Axial Volcano example as a whole class and highlight the evidence included at the end of the first paragraph.
        ii. Review grading rubric with students. Students should refer to the Gotta-have checklist (see example) when writing their explanation as the Gotta-have checklist includes all observable and unobservable components/parts and all essential science ideas/concepts (see Rubric).
        iii. Discuss helpful hints to get students started

2. Students work independently to write or type their final explanations for the driving question, "Why might the Arctic be warming four times as fast as the rest of the world?"
    a. Students may refer to any and all worksheets, notes, public records, etc. from the unit when writing their final explanations (see Final Explanation examples).

Optional: Additional Resources (from Model-Based Inquiry)
Consider using one or more of the resources below to scaffold and support students' written explanations:

- Is it important to distinguish between the explanation and argumentation practices in the classroom? (STEM Teaching Tools)
- Constructing Explanations and Designing Solutions (Framework for K12 Science Education)
- Supporting ELL Explanations (Ambitious Science Teaching)
- Scaffolding Students' Written Explanations (Ambitious Science Teaching)
- Writing a Scientific Explanation Using the Explanation Tool (American Museum of Natural History)