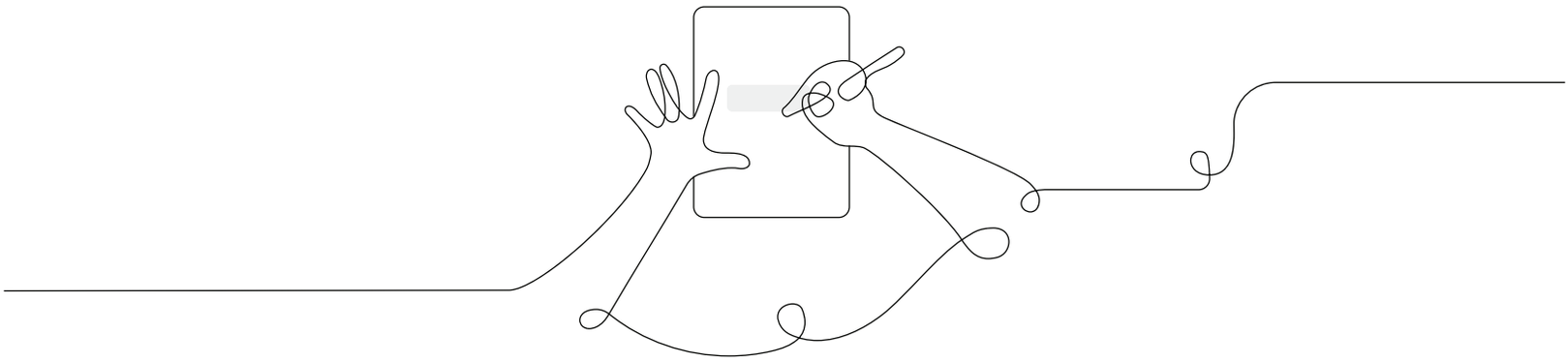
AmplifyScience

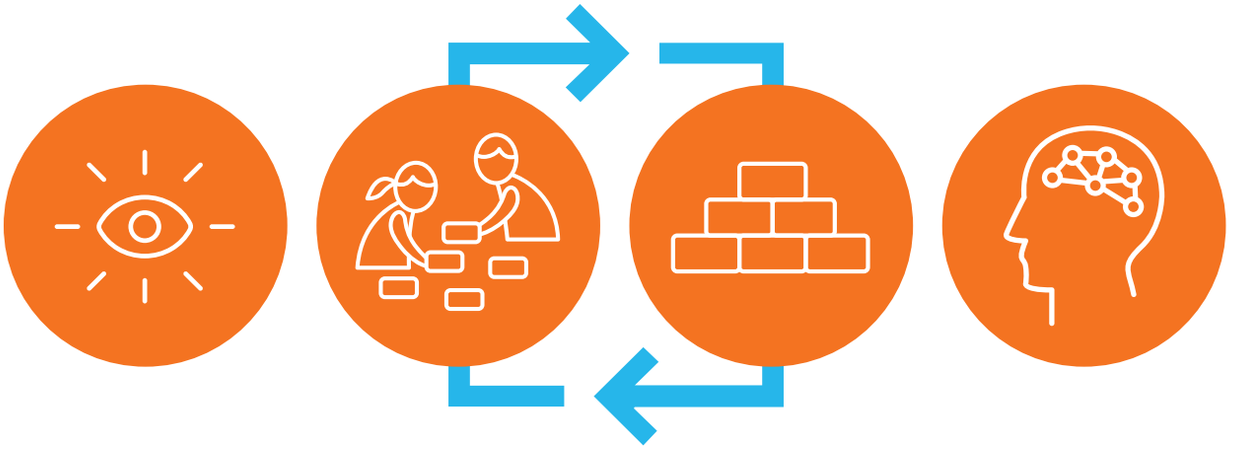
Participant Notebook

Applying Reading and Writing Strategies to Support Claims, Evidence and Reasoning within the Amplify Science Curriculum

Grade 7



Amplify Science approach



Introduce a **phenomenon** and a related problem

Collect **evidence** from multiple sources

Build increasingly complex **explanations**

Apply knowledge to solve a different problem

Three dimensions of NGSS reference

3-D learning engages students in using scientific and engineering practices and applying crosscutting concepts as tools to develop understanding of and solve challenging problems related to disciplinary core ideas.

Science and Engineering Practices

1. **Asking Questions and Defining Problems**
2. **Developing and Using Models**
3. **Planning and Carrying Out Investigations**
4. **Analyzing and Interpreting Data**
5. **Using Mathematics and Computational Thinking**
6. **Constructing Explanations and Designing Solutions**
7. **Engaging in Argument from Evidence**
8. **Obtaining, Evaluating, and Communicating Information**

Disciplinary Core Ideas

Earth and Space Sciences:
ESS1: Earth's Place in the Universe
ESS2: Earth's Systems
ESS3: Earth and Human Activity

Life Sciences:
LS1: From Molecules to Organisms
LS2: Ecosystems
LS3: Heredity
LS4: Biological Evolution

Physical Sciences:
PS1: Matter and its Interactions
PS2: Motion and Stability
PS3: Energy
PS4: Waves and their Applications

Engineering, Technology and the Applications of Science:
ETS1: Engineering Design
ETS2: Links among Engineering Technology, Science and Society

Crosscutting Concepts

1. **Patterns**
2. **Cause and Effect**
3. **Scale, Proportion, and Quantity**
4. **Systems and System Models**
5. **Energy and Matter**
6. **Structure and Function**
7. **Stability and Change**

Science Engineering Practices (SEPs)

1. Asking questions and defining problems

2. Developing and using models

3. Planning and carrying out investigations

4. Analyzing and interpreting data

5. Using mathematics and computational thinking

6. Constructing explanations and designing solutions

7. Engaging in argument from evidence

8. Obtaining, evaluating, and communicating information

How is literacy embedded in the Amplify Science curriculum?

Exploring an Active Reading Sequence

Directions:

- Navigate to your current unit
- Scroll down to the Unit Guide
- Click Articles in This Unit
- Choose an article
- Fill out this sheet

Unit Title:	Article Title:	
What is the article about?		
First Read		
What is the purpose of this read?	What are students doing as they read? How are they supported?	How does this build on students' unit-level understanding?
Second Read		
What is the purpose of this read?	What are students doing as they read? How are they supported?	How does this build on students' unit-level understanding?
Third Read		
What is the purpose of this read?	What are students doing as they read? How are they supported?	How does this build on students' unit-level understanding?

Analyzing the Purpose of Writing

Unit: _____ Chapter: _____

Directions:

1. Download your unit's Investigation Notebook from Printable Resources in the Unit Guide. Use this to help you identify opportunities for students to write.
2. Analyze the purpose of each writing opportunity in a chapter.
    a. Record the activity and lesson in the first column.
    b. If the purpose of activity is unclear from the Investigation Notebook page, use your Coherence Flowchart, the Lesson Overview Compilation, or navigate to the activity in the Teacher's Guide to learn more about the context.

Activity	**Purpose for the student to write** ● How will the student find this useful?	**Purpose for the teacher** ● How will you find this helpful?

Analyzing the Purpose of Writing, cont.

Activity	**Purpose for the student to write** ● How will the student find this useful?	**Purpose for the teacher** ● How will you find this helpful?

Word bank			
activate argue evidence	explain gather persuade record	reflect remember sense-making	support synthesize thinking understand

Discourse Routines [K-8]

Explanation Language Frames - a gradual release strategy that provides students with a structure to frame their thinking. Ex: Turtles need a _ to survive because_.

Thought Swap - an interactive activity that allows students to practice speaking and listening. Students form two lines facing one another. The teacher poses an open-ended question aligned to the unit/chapter/lesson. The first student responds to the question and the second student repeats what they heard said and then asks a probing/clarifying question. Then the second student adds their thoughts and the first students repeats what they heard them say. Then the students swap partners to respond to another open-ended question or idea.

Think - pair - share (TPS) - is a collaborative learning strategy where students work together to solve a problem or answer a question. This strategy requires students to (1) think individually about a topic or answer to a question; and (2) share ideas with a partner.

Shared Listening - Whole group or small group opportunity for students to listen to someone share ideas or provide an explanation. Shared Listening, similar to Thought Swaps, enlist students to restate (verbally or in writing) what they've heard in order to demonstrate understanding and comprehension.

Partner reading - a cooperative learning strategy to increase comprehension. Partner reading is when students read an assigned text with a partner. The students share the text and take turns reading. They may take turns reading every other sentence, or every other page. The teacher circulates to listen and ask probing questions that enable them to understand student learning.

Science Seminars [6-8] -Typically facilitated in inner-outer circle format, the teacher poses an open-ended question. The questions are designed to elicit multiple perspectives based on the evidence cards sorted in a previous lesson. Students use evidence from multiple sources to support their claim and justify their reasoning, as well as challenge the thinking of others. The teacher is the facilitator and challenges students to evaluate and synthesize their ideas. This discourse opportunity gives students tremendous agency in thinking about content and evidence in order to make convincing oral arguments.

Evidence Circles - sorting activity to match claims, evidence and reasoning, facilitated in whole and small groups. Students use sentence frames and evidence gradients to align evidence that best support their claim.
Word Relationships - a strategy used to help students make connections between concepts based on key characteristics. Routinely making connections gives students the necessary practice with recognizing patterns, identifying relationships, and building upon complex ideas.

Questioning Strategies - In order to engage all learners in the classroom, ensuring everyone has the opportunity to participate in discussions and do the important thinking when a question is posed, teachers use a variety of questioning strategies along Bloom's Taxonomy. Questions are pre-planned prior to the lesson and specifically aligned to the learning objectives and differentiated student needs.

Completed Scientific Argumentation Wall Diagram

Scientific Argumentation

1.3

The purpose of a scientific argument is to convince others, using evidence and reasoning.

1.3

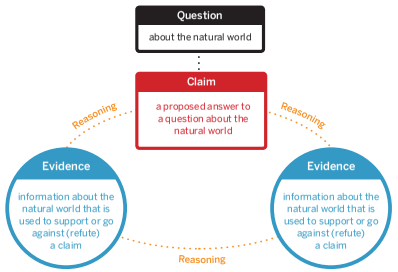
Evaluating Evidence

1.3

Evidence can support or go against a claim.

1.3

Scientific Argument



1.3

Reasoning Tool

Evidence	This matters because . . . (How does this evidence support the claim?)	Therefore, . . . (claim)

3.3

Evidence Gradient

3.1

Example Student Arguments

3.4

A scientific argument . . .

- begins with a question.
- has a claim that proposes an answer to the question.
- has evidence that supports the claim.
- clearly explains how the evidence supports the claim (reasoning).

1.3

Argumentation Sentence Starters

- I think this evidence supports this claim because . . .
- I don't think this evidence supports this claim because . . .
- I agree because . . .
- I disagree because . . .
- Why do you think that?

1.3

Writing a Scientific Argument

Name _____ Date _____

Get ready to write by answering the questions below. After you have answered the questions, write a scientific argument that answers the Science Seminar question.

Question: Which suspect is most likely to have made the hydrofluoric acid? 

Claim 1: Pat is most likely to have made the hydrofluoric acid by using sulfuric acid and calcium fluoride. 

Claim 2: Alex is most likely to have made the hydrofluoric acid by using sulfuric acid and magnesium chloride. 

Claim 3: Tracy is most likely to have made the hydrofluoric acid by using purified water and fluorine. 

Atom Key

H	O	S	Cl	Mg	F	Ca
hydrogen	oxygen	sulfur	chlorine	magnesium	fluorine	calcium

1. Which claim are you going to make in your argument?
   - ○ **Claim 1:** Pat is most likely to have made the hydrofluoric acid by using sulfuric acid and calcium fluoride.
   - ○ **Claim 2:** Alex is most likely to have made the hydrofluoric acid by using sulfuric acid and magnesium chloride.
   - ○ **Claim 3:** Tracy is most likely to have made the hydrofluoric acid by using purified water and fluorine.
   - ○ **None of the above.** I will write my own claim:_____.

2. Review the Suspect Evidence Cards and the models you created to show whether or not each suspect could have made hydrofluoric acid. Consider how the information presented in the evidence cards might relate to your models. Then, select the pieces of evidence you are going to use in your argument from the list below.

- ☐ **Evidence Card A:** When the police searched Pat's house, they found some calcium sulfate ($CaSO_4$).
- ☐ **Evidence Card B:** The police did **not** find hydrofluoric acid (HF), sulfuric acid (H_2SO_4), or calcium fluoride (CaF_2) in Pat's house.
- ☐ **Evidence Card C:** When the police searched Tracy's house, they found some purified water (H_2O).
- ☐ **Evidence Card D:** The police did **not** find hydrofluoric acid (HF), fluorine (F_2), or any other unusual substances in Tracy's house.
- ☐ **Evidence Card E:** According to Dr. Yung, calcium sulfate ($CaSO_4$) is a substance commonly used in sculpting.
- ☐ **Evidence Card F:** According to Dr. Yung, oxygen (O_2) is a colorless, odorless gas that is commonly found in air.
- ☐ **Evidence Card G:** The chemical supply company confirmed the delivery of sulfuric acid (H_2SO_4) and calcium fluoride (CaF_2) to Pat's house.
- ☐ **Evidence Card H:** The chemical supply company confirmed the delivery of purified water (H_2O) and fluorine (F_2) to Tracy's house.

3. Write a scientific argument that addresses the question: Which suspect is most likely to have made the hydrofluoric acid? First, state your claim. Then, use evidence to support your claim. For each piece of evidence you use, explain how the evidence supports your claim. As you write, refer back to your completed Modeling Tool sheets and Suspect Evidence Cards.

Notes