

Amplify Science

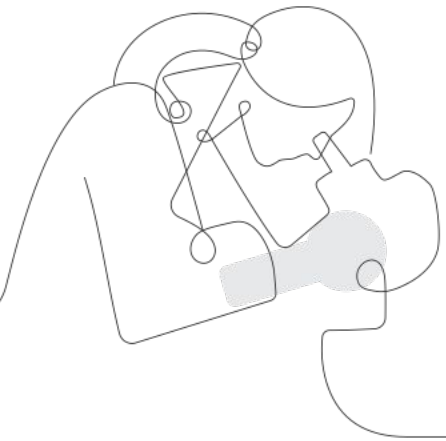
Grade 7: Chemical Reactions

Applying Reading and Writing Strategies
to support Claims, Evidence, and Reasoning
within the Amplify Science classroom.

School/District Name

Date

Presented by Your Name



Welcome to Amplify Science!

Do Now: Log In

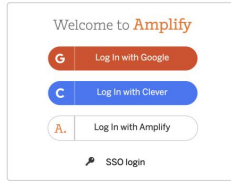
Log In with Amplify

K-8 Classroom Teachers | Clever Login

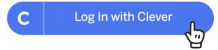
1. Go to learning.amplify.com

Reminders:

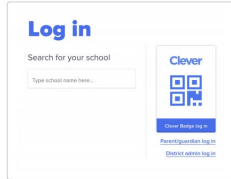
- Use the latest version of Safari or Chrome
- Supported devices: iPad 5 or more recent, MacBooks, Windows laptops or desktops, and Chromebooks
- **Pro Tip:** Bookmark this url in your browser



2. Select **Log In with Clever**



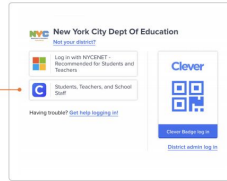
3. Search for and **select your school by name or DBN** (ex. 00M000 - PS/IS School Name)



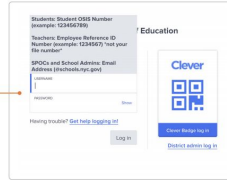
AmplifyScience

K-8 Classroom Teachers | Clever Login

4. Select **Students, Teachers, and School Staff**



5. Enter your district **Employee ID number** in both **username** and **password** fields



6. Click **Log In**

Email help@amplify.com or call (800)823-1969 for additional support.

AmplifyScience

Log in with TeachHUB

Clever

TeachHub: Teacher Login Guide

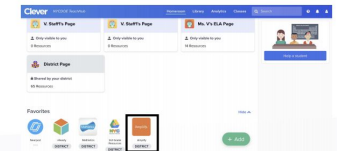
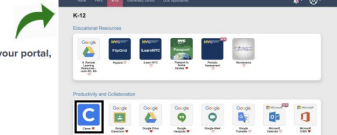
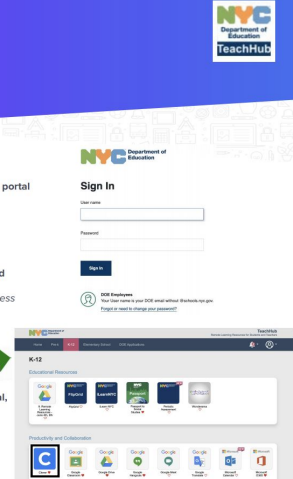
1. Head to the DOE's new Remote Learning portal at teachhub.schools.nyc

2. Enter your DOE username and password

**For teachers, this is your DOE email address with the @school.nyc.gov removed.*

3. Select the K12 tab at the top of your portal, then click on the Clever app

4. Click on the Amplify icon



Clever
Questions? Visit support.clever.com.

Use two windows for today's webinar

The image illustrates how to maximize two browser windows for a webinar. It shows two windows side-by-side:

- Window #1:** A Google Meet page titled "Meet - Etiwanda Grade 7 N". The address bar shows "meet.google.com/hcs-dxpk-wrm?aut...".
- Window #2:** An Amplify Science lesson page titled "Lesson 1.2: Using Fossils to Understand Earth". The address bar shows "apps.learning.amplify.com/curriculu...".

An inset in the top-left corner shows a mouse cursor clicking the maximize button (the green square icon) in the top-left corner of the first window's title bar.

Window #1 Content:

- Amplify Science logo and navigation: Plate Motion > Chapter 1 > Lesson 1.2
- Section: OPEN PRINTABLE PROGRESS BUILD
- Text: Progress Build Level 1: The Earth's entire outer layer (below the water and soil that we see) is made of solid rock that is divided into plates. Earth's plates can move.
- Text: Underneath the soil, vegetation, and water that we see on the surface of Earth is the outer layer of Earth's geosphere, the solid part of our rocky planet. This outer layer of Earth is covered entirely with hard, solid rock that is divided into sections called plates. And, these plates can move.
- Text: Progress Build Level 2: The plates move on top of a soft, solid layer of rock called the mantle. At plate boundaries where the plates are moving away from each other, rock rises from the mantle and hardens, adding new solid rock to the edges of the plates. At plate boundaries where plates are moving toward each other, one plate moves underneath the other and sinks into the mantle.
- Text: Underneath the soil, vegetation, and water that we see on the surface of Earth is the outer layer of Earth's geosphere, the solid part of our rocky
- Buttons: Getting Ready to Teach, Materials and Preparation, Español
- Right sidebar: Flexension Compilation, Investigation Notebook, NGSS Information for Parents and Guardians, Print Materials (11" x 17"), Print Materials (8.5" x 11"), Offline Preparation (Teaching without reliable classroom internet? Prepare unit and lesson materials for offline access. Offline Guide)

Window #2 Content:

- Amplify Science logo and navigation: CALIFORNIA > Plate Motion > Chapter 1 > Lesson 1.2
- Lesson Title: Lesson 1.2: Using Fossils to Understand Earth
- Lesson Brief (4 Activities): 1 WARM-UP Warm-Up, 2 TEACHER-LED DISCUSSION Introducing Mesos
- Buttons: RESET LESSON, GENERATE PRINTABLE LESSON
- Lesson Brief: Overview, Materials & Preparation, Differentiation, Español rds
- Digital Resources: All Projections, Completed Scientific Argumentation Wall Diagram, Video: Meet a Paleontologist, The Ancient Mesosaurus

Remote Professional Learning Norms



Take some time to orient yourself to the platform

- *“Where’s the chat box? What are these squares at the top of my screen?, where’s the mute button?”*



Mute your microphone to reduce background noise unless sharing with the group



The chat box is available for posting questions or responses to during the training



Make sure you have a note-catcher present



Engage at your comfort level - chat, ask questions, discuss, share!

Objectives:

By the end of this workshop, you will be able to:

- Focus on the shifts in emphasizing the Science and Engineering practices which require students to read and write like scientists.
- Identify embedded strategies for explicit literacy support.
- Understand how these strategies help students make and evaluate claims, gather evidence, and justify arguments with relevant reasoning.
- Engage in reflection on how a science seminar structures opportunities for verbal and written argumentation.

e



Capturing key takeaways!

A notebook page with a grid for capturing key takeaways. The page is lined and has a red vertical margin line on the left. A pencil icon is in the top left corner. The grid is defined by a vertical black line and a horizontal black line. The four quadrants are labeled as follows:

<i>Embedded Strategies</i>	<i>The shifts</i>
<i>Applying the Strategies through the Science Seminar</i>	<i>Additional Notes</i>

Plan for the day

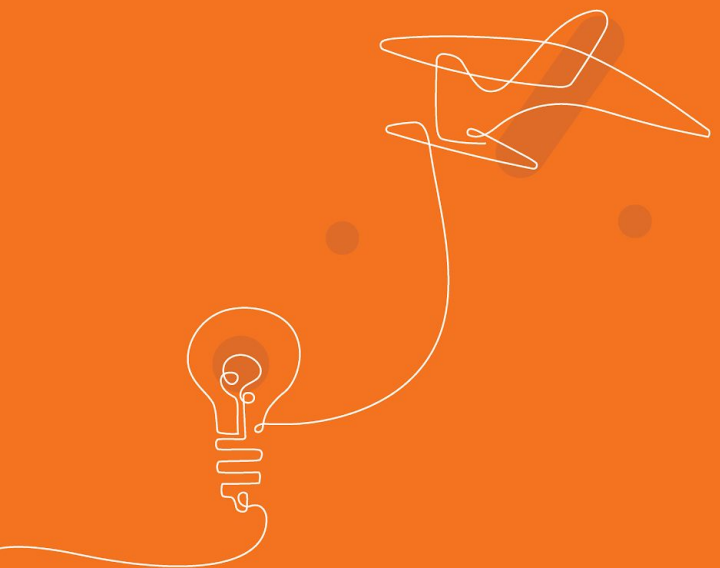


- Framing the day
 - Welcome and introductions
- Shifts in Science Instruction
 - Revisiting the Amplify Science approach
 - Revisiting Resources
 - Science and Engineering practices
- Science and Literacy
 - Embedded literacy supports
 - Embedded literacy strategies
- Applying the Strategies through the Science Seminar
 - Evaluating claims, gathering evidence, and justifying arguments with reasoning
- Reflection and closing

Plan for the day



- Framing the day
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Welcome and Introductions

Who's in the Room?

Represent for your borough!



Share your **name, role, & borough.**

Example: Isis, Teacher, 1

1- Brooklyn North

2- Brooklyn South

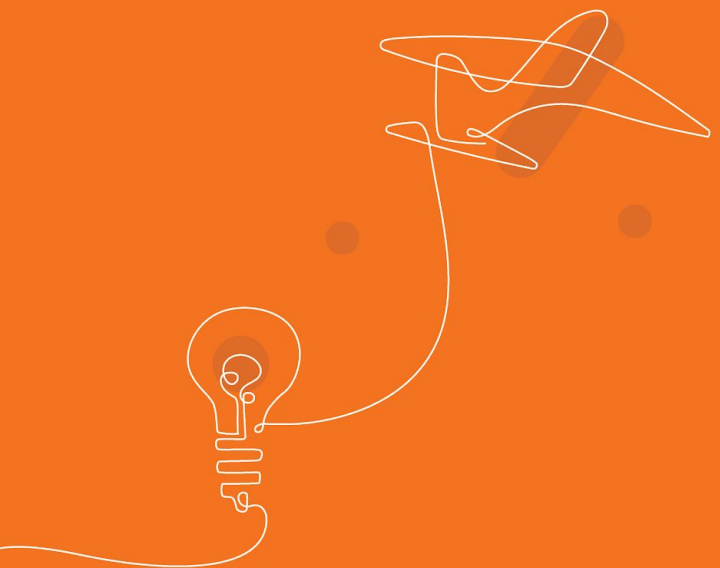
3- Queens North

4- Queens South

5- The Bronx

6- Staten Island

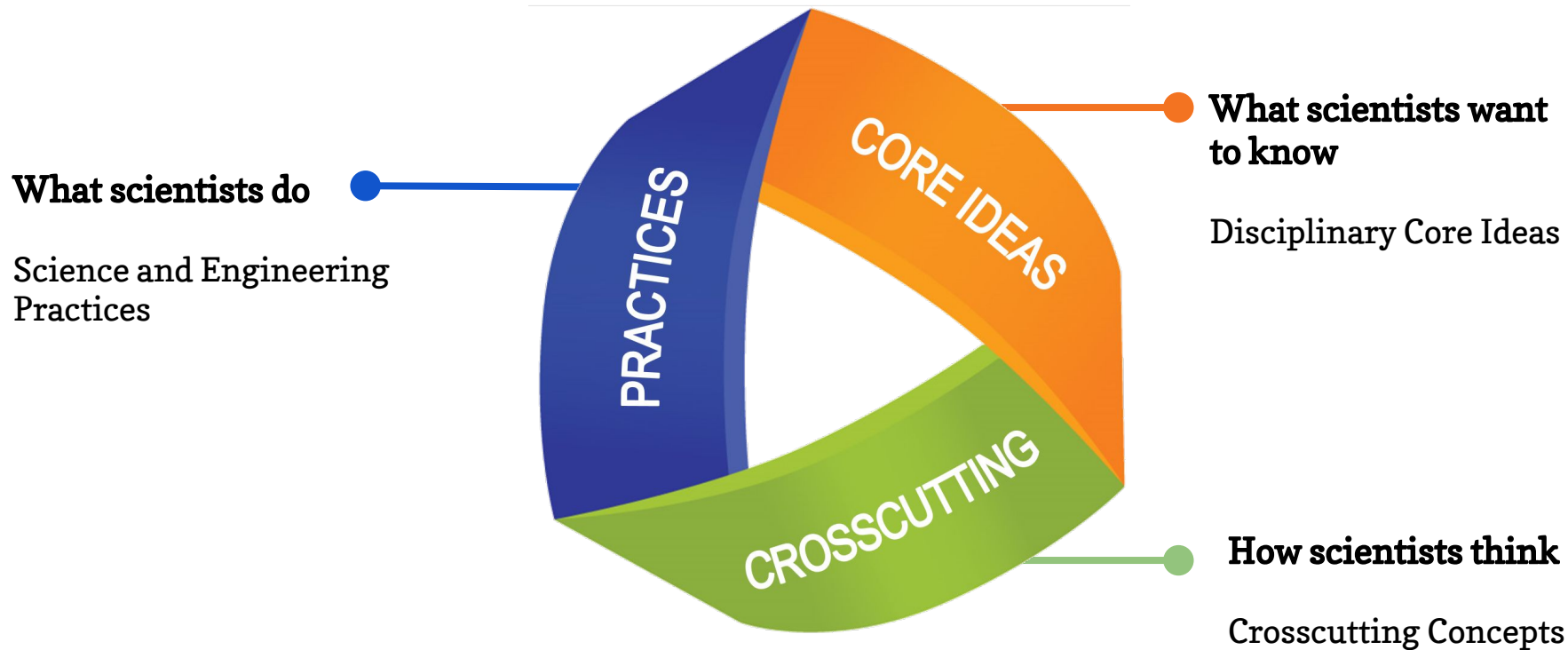
7- Manhattan



Revisiting the Amplify Science approach

Next Generation Science Standards

Designed to help students build a cohesive understanding of science

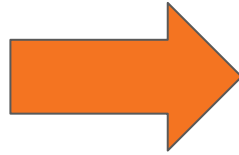


Comparing topics and phenomena

A shift in science instruction

from learning about

(like a student)

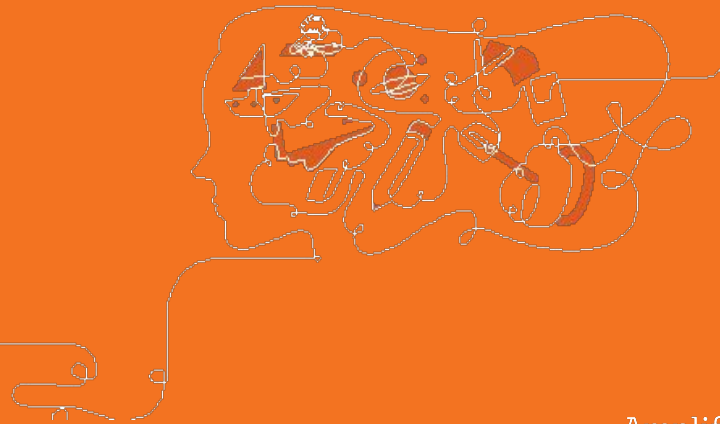


to figuring out

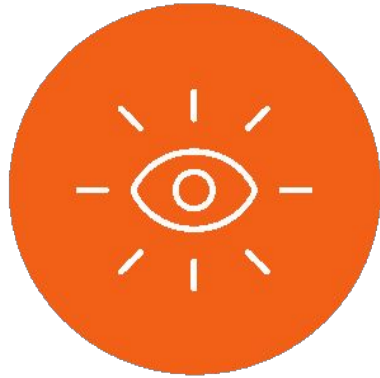
(like a scientist)

Problem-based deep dives

Students inhabit the role of scientists and engineers to explain or predict phenomena. They use what they figure out to solve real-world problems.



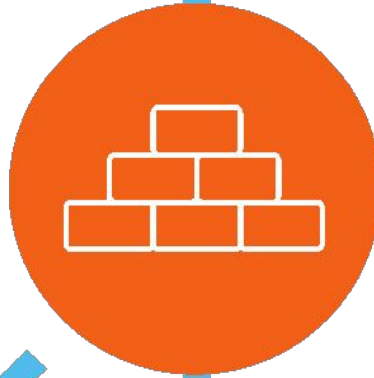
Amplify Science approach



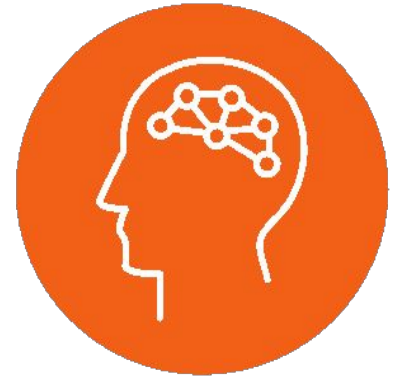
Introduce a real world problem



Collect evidence from multiple sources



Build increasingly complex explanations



Apply knowledge to solve a different problem



Do



Talk



Read



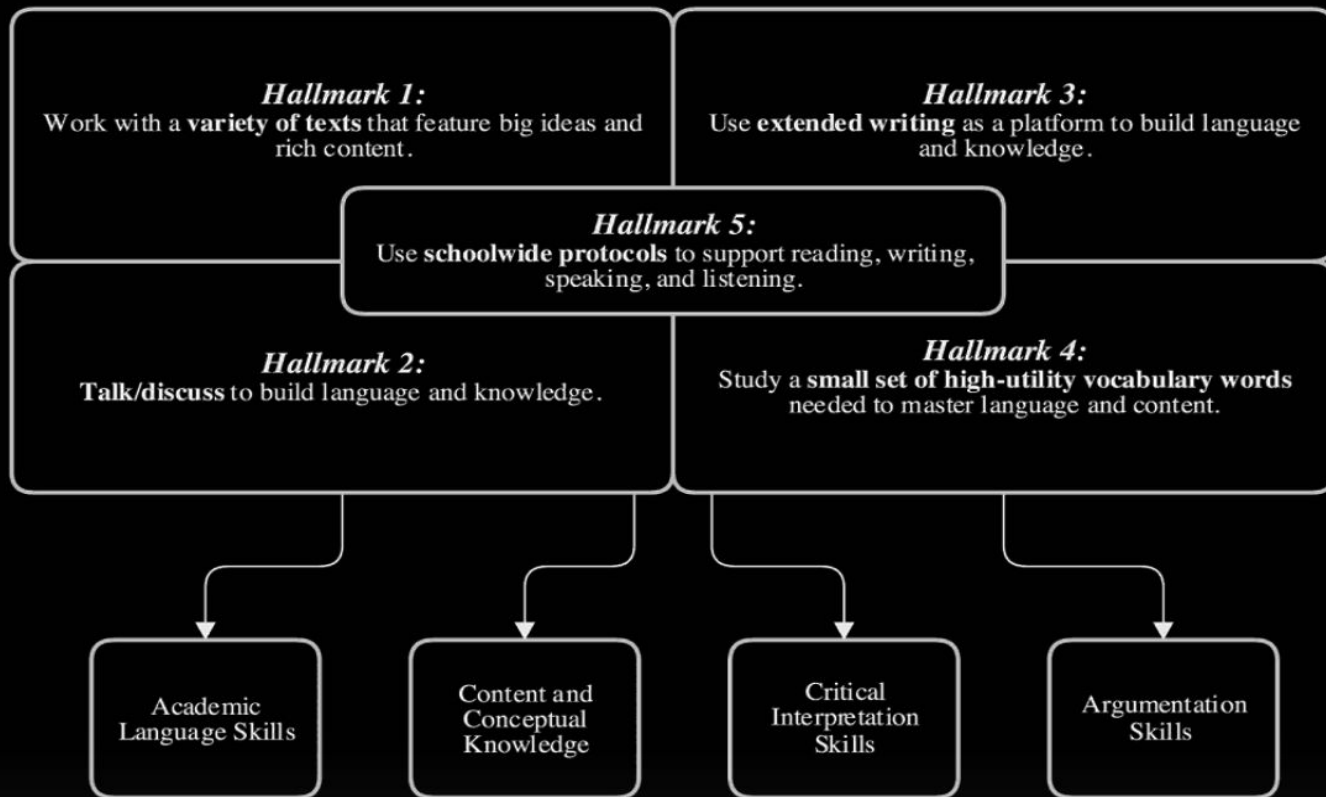
Write



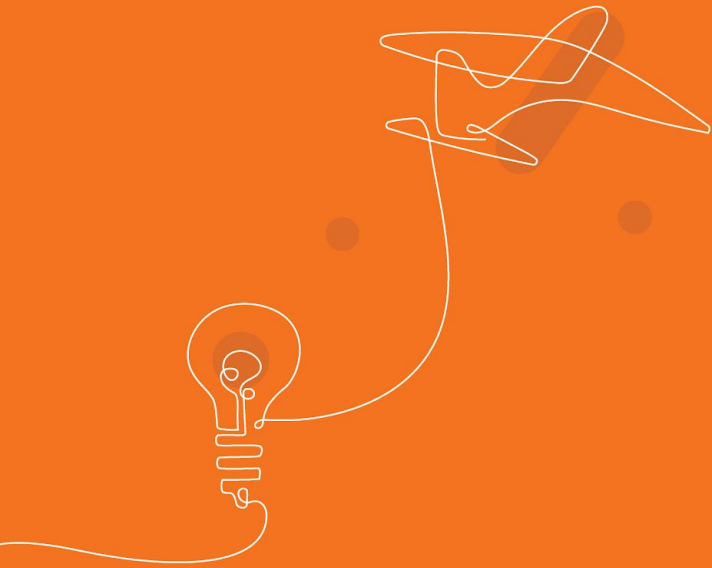
Visualize

Advanced Literacies

Strengthening the Instructional Core



Revisiting Resources



Middle School Curriculum New York City Edition

Grade 6

- Launch: *
Harnessing Human Energy
- Thermal Energy
- Ocean, Atmosphere, and Climate
- Weather Patterns
- Populations and Resources
- Matter and Energy in Ecosystems
- Earth's Changing Climate

Grade 7

- Launch: *
Microbiome
- Metabolism
- Phase Change
- Chemical Reactions
- Plate Motion
- Engineering Internship:
Plate Motion
- Rock Transformations
- Engineering Internship:
Earth's Changing Climate

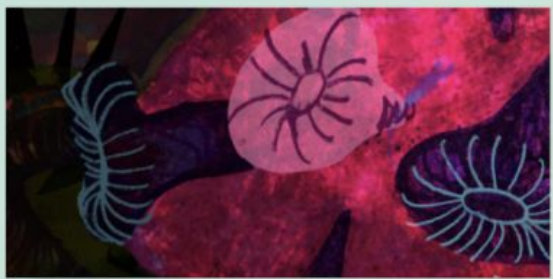
Grade 8

- Launch:
Geology on Mars
- Force and Motion
- Engineering Internship:
Force and Motion
- Earth, Moon, and Sun
- Magnetic Fields
- Light Waves
- Traits and Reproduction
- Natural Selection
- Evolutionary History



Middle School curriculum: Unit types

Launch Units



11 Lessons

Microbiome

Core Units



19 Lessons

Metabolism

Engineering Internships



10 Lessons

Metabolism Engineering Internship

Middle school unit resources



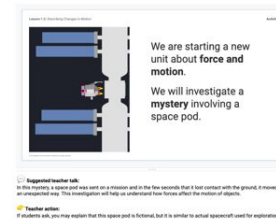
Investigation
Notebooks or digital
student experience



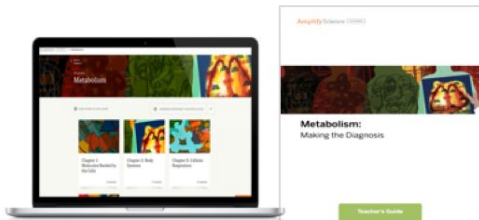
Articles
(digital or print)



Simulations and other
digital tools



Classroom Slides



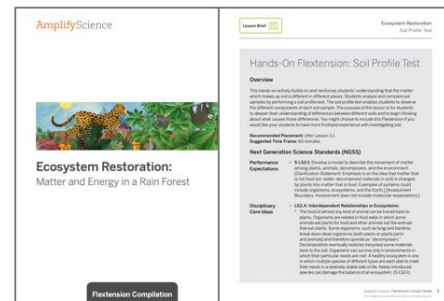
Teacher's Guide
(digital or print)

ACTIVITIES	LEVELS
25/06 5:28 PM Wed. 6/12/18	0
25/06 5:00 PM Wed. 6/12/18	2 missing
25/06 4:57 PM Wed. 6/12/18	0
25/06 3:42 PM Thu. 6/12/18	0

Assessments and
Reporting






Hands-on and print
materials



Hands-on Flexextensions

Middle School Online Component

Warm-Up Assign in Google  

Students record and discuss their initial ideas about what might be causing Elisa to feel tired.
(5 min)  INSTRUCTIONAL GUIDE

Step-by-step Teacher Support Possible Responses My Notes

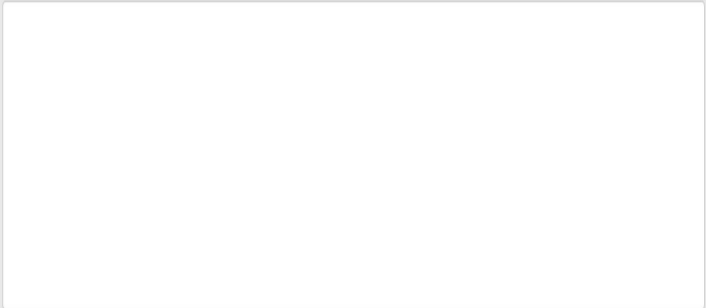
1. Project Warm-Up questions and review routine. Collapse the instructional guide and project the student screen, or have students turn to page 6 in their Investigation Notebooks. Explain that at the beginning of every lesson, there will be a prompt (a question or an activity) for students to complete independently that will help them begin to think about the science ideas they will learn. Point out that today, they will answer questions about the video they just watched.


2. Have students work independently. Give students a few minutes after the video is finished to individually respond to the Warm-Up activity. Circulate and offer support, as needed.

3. Invite students to share their responses with a partner. When most students are done with the activity, prompt them to share their ideas about Elisa's symptoms with their partners.

Warm-Up

Why do you think your new patient, Elisa, is feeling tired all the time? Explain your ideas.





Welcome Science Educators!

The Amplify Science Program Hub was created to provide you with resources, tools, and advice for all stages of your implementation. Want a tour? Click [here](#)!

Remote and hybrid learning resources

Amplify Science@Home makes remote and hybrid learning easier.



Professional Learning Resources

Let's get started!

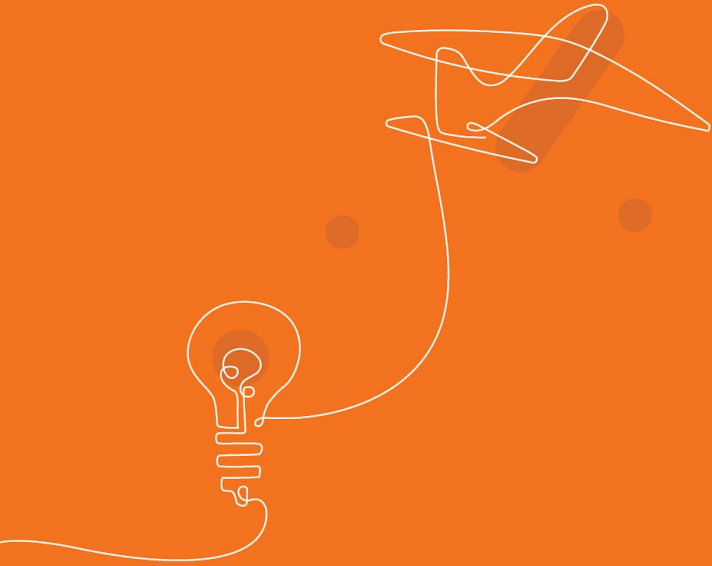


Additional Unit Materials

Additional resources to complement the units you're teaching.



Science and Engineering Practices



Chemical Reactions

An illustration depicting a chemical reaction. In the center, a round-bottom flask is being filled with a mixture of yellow and red liquids poured from two other flasks above it. To the left, three test tubes are shown. To the right, a beaker contains a blue liquid with a glass rod. The background is a light blue, bubbly texture with scattered red and yellow spheres, suggesting a molecular or atomic level.

Chemical Reactions

Unit Phenomena:

In the role of student chemists, students explore how new substances are formed as they investigate a problem with the water supply in the fictional town of Westfield. They analyze a reddish-brown substance that is in the water, the iron that the town's pipes are made of, and a substance from fertilizer found to have contaminated the wells that are the source of the town's water, and use their findings to explain the source of the contaminating substance.

Anchor Phenomenon: A mysterious brown substance has been detected in the tap water of Westfield.

Student Role: Students play the role of forensic chemists, applying what they learn about matter and chemical reactions to solve the mystery of mysterious substances appearing in a county's water supply.

Chemical Reactions SEP's

As with all Amplify Science units, the *Chemical Reactions* unit provides students with exposure to most of the science and engineering practices described in the Next Generation Science Standards. This unit particularly emphasizes the following practices:

- **Practice 1: Asking Questions.** As students investigate what caused the problem with the water supply, their inquiry is guided by a series of strategic questions. They also have many opportunities to pose their own questions. In particular, the Active Reading approach, an approach to reading based on curiosity and inquiry, supports students in asking thoughtful questions as they read science articles.
- **Practice 2: Developing and Using Models.** Students spend ample time exploring and investigating a digital simulation that models how substances behave at the atomic scale during chemical reactions. They also create visual models that show their ideas about how substances form during chemical reactions.
- **Practice 3: Planning and Carrying Out Investigations.** Students conduct investigations using the digital simulation and with real substances to develop an understanding of properties of substances and of chemical reactions.
- **Practice 4: Analyzing and Interpreting Data.** Students analyze data about the properties of substances and data about the atoms that make up substances.
- **Practice 6: Constructing Explanations.** Students spend time discussing, writing, and creating models to aid them in developing their explanations of concepts presented in the unit.
- **Practice 7: Engaging in Argument from Evidence.** Students receive instruction about the structure of a scientific argument and are supported in evaluating evidence, engaging in scientific reasoning, and producing written arguments.
- **Practice 8: Obtaining, Evaluating, and Communicating Information.** Students have multiple opportunities to engage in Active Reading, an approach to obtaining information from science texts. Students also evaluate evidence to determine its strength.

Chemical Reactions

Multiples Modalities

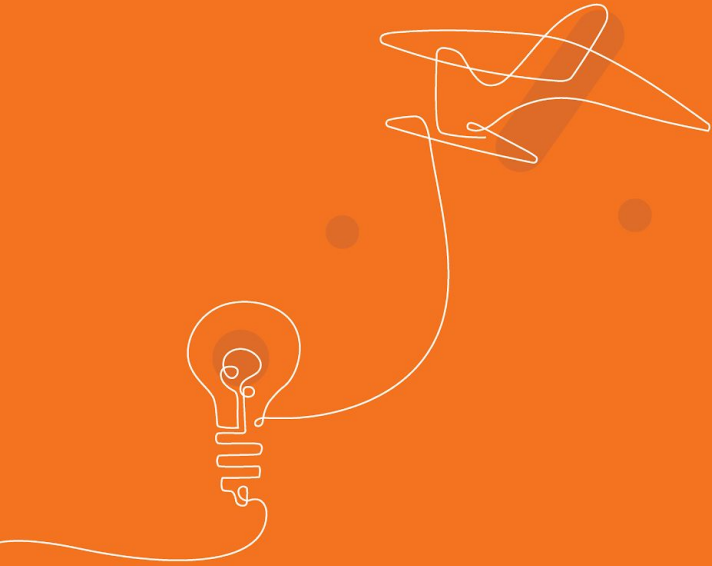
- **Do.** Students investigate and observe substances at the atomic scale, using the *Chemical Reactions* Simulation. On several occasions, they use this information to explain an observable change in appearance they witnessed during a hands-on activity.
- **Talk.** There are multiple opportunities to engage in student-to-student and whole-class discussions that reflect on the connection between the changes that can be observed and what is happening at the atomic scale during a chemical reaction.
- **Read.** In the “Atomic Zoom-In” and “What Happens When Fuels Burn?” articles, students read about the connection between the atomic scale and how it relates to what can be observed.
- **Write.** Students write scientific arguments explaining how changes at the atomic scale lead to the observable appearance of rust and another substance in Westfield’s water supply.
- **Visualize.** Students represent their ideas about chemical reactions by creating visual atomic- scale models in the *Chemical Reactions* Modeling Tool that help explain observable phenomena.

Plan for the day

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 - Embedded literacy strategies
- Applying the Strategies through the Science Seminar
 - Evaluating claims, gathering evidence, and justifying arguments with reasoning
- Reflection and closing



Science and Literacy





Embedded Literacy Supports

Welcome

Program developers

Designed for the NGSS

Program components

Scope and Sequence

Phenomena, standards, and progressions

Assessments

Science and literacy



Access and equity

Resources

Welcome

The Program Guide details information about the program, including its authorship, development, themes, and more. It serves as a resource for finding out more about the program's structure, components, supports, how it meets standards, and flexibility.

Navigate through the links on the left-hand side of the page to access more information about the program and to explore resources that can help with your implementation.

ACCESS THE DIGITAL
CURRICULUM

Support

[Amplify Help Center](#)

[1-800-823-1969](tel:1-800-823-1969)

scihelp@amplify.com

More Amplify Science

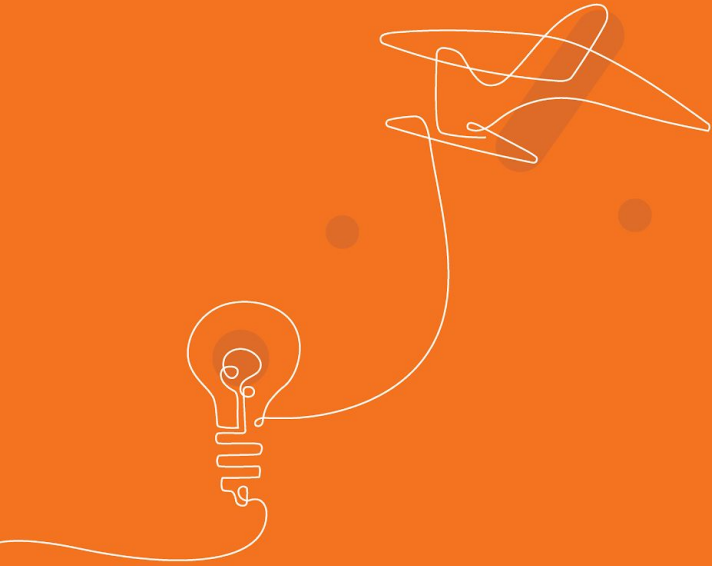
[Transitional Kindergarten \(TK\)](#)

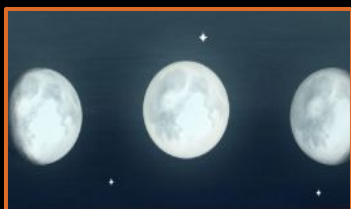




Embedded Literacy Strategies

Active Reading





Explicit instruction in reading 56 times in each course
x 3 years = at least 170 opportunities to practice Active
Reading in middle school science

Reflect and Share

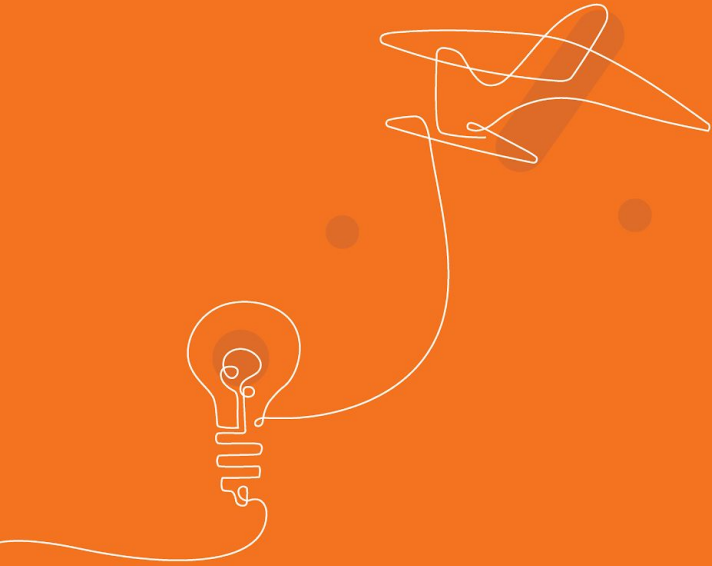
- What has been a challenge of reading in Amplify Science in your classroom? What has been a success?
- What strategies do you use to engage and support your students with reading in Amplify Science while teaching remotely?

Active Reading

- Active reading is explicitly introduced in the Launch Unit for each grade level.
- Available formats:
 - Article Compilation (PDF)
 - Digital Articles (digital library)
 - Student Editions (hardcover books)



Active Reading Instructional Approach



A typical Active Reading sequence

First Read

Independent,
followed by
paired and
whole class
discussion

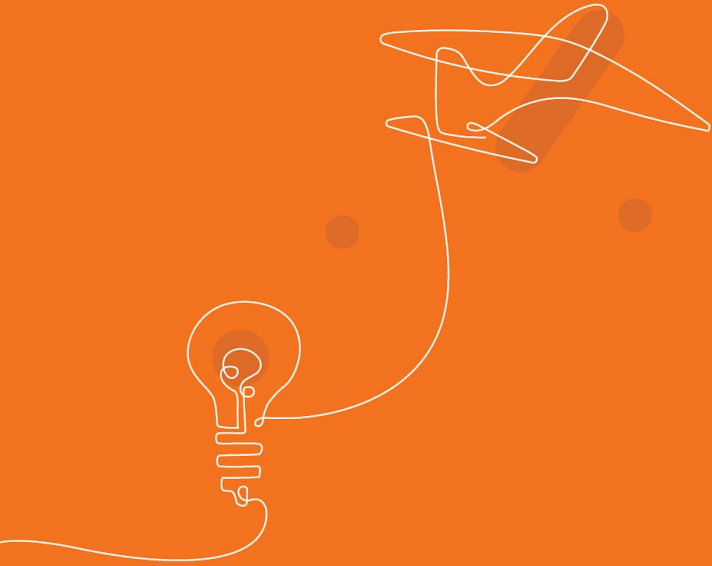
Second Read

Reading for a
teacher-directed
purpose, followed
by a paired,
complementary
activity

Third Read

Diving into the
text for other,
content-related
purposes

Active Reading Components



A typical Active Reading sequence

First Read

Independent,
followed by
paired and
whole class
discussion

Second Read

Reading for a
teacher-directed
purpose, followed
by a paired,
complementary
activity

Third Read

Diving into the
text for other,
content-related
purposes

Text Roles/Functions for Inquiry-Based Investigations

Provide context for inquiry-based investigations	Scientists read and interpret others' data and findings
Deliver content	Illustrate phenomenon that would otherwise be unobservable; opportunities to apply what students are learning
Model scientific processes	Model inquiry processes; Modeling scientific dispositions; Depicting scientists and their work
Support secondhand investigations (collection of textual data)	Provides data for interpretation represented with graphs, pictures, tables; communicating visuals information based in data
Support first-hand investigations (collection of empirical data)	Providing students information to supplement their empirical (first-hand) studies; Support the design and implementation of investigations.

From Cervetti, G. N. & Barber, J. (2009). Text in hands-on science. In Hiebert, E. H. & Sailors, M. (Eds.) *Finding the Right Texts: What Works for Beginning and Struggling Readers*. New York: The Guilford Press.

Students read each article twice
The first read is always to annotate
(questions, connections, comments, etc.)



Science and Engineering Practices

8. Obtaining, Evaluating, and Communicating Information

Subsequent reads are for a particular purpose

- To examine a specific visual representation
- To answer a question
- To find evidence to support a claim, or
- To draw conclusions across texts, etc.

Active Reading

Active Reading Guidelines

1. Think carefully about what you read. Pay attention to your own understanding.
2. As you read, annotate the text to make a record of your thinking. Highlight challenging words and add notes to record questions and make connections to your own experience.
3. Examine all visual representations carefully. Consider how they go together with the text.
4. After you read, discuss what you have read with others to help you better understand the text.

Exploring an Active Reading Sequence

Directions:

- Navigate to the Chemical Reactions unit
- Scroll down to the Unit Guide
- Click “Articles in This Unit”
- Choose an article
- Fill out the sheet on page 6 of your participant notebook

Exploring an Active Reading Sequence

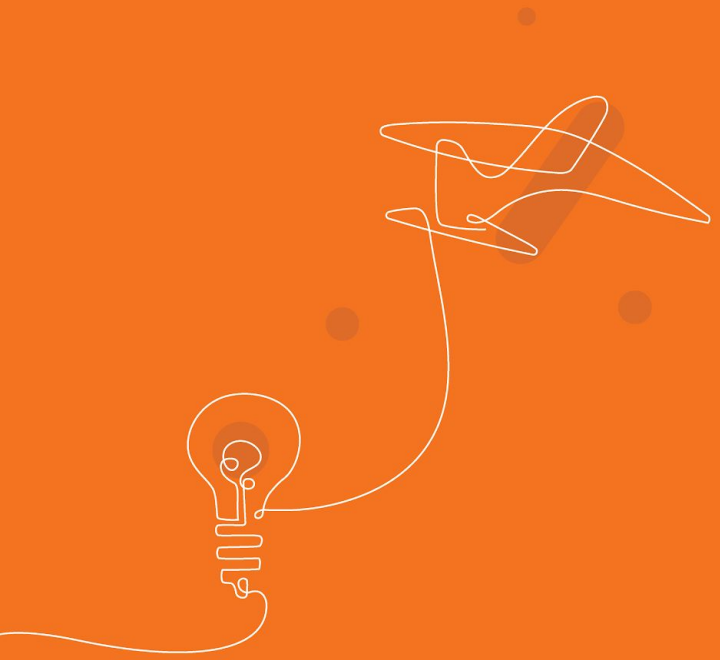
Directions:

- 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?

6

Amplify.



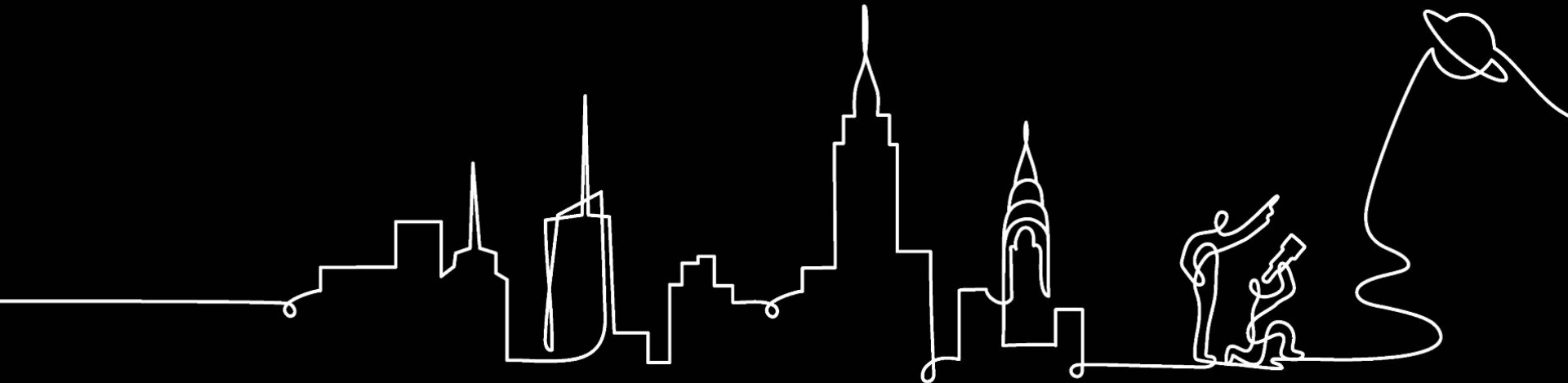
Writing

Reflect and Share

- What is the purpose of writing in Amplify Science?
- What has been a challenge of writing in Amplify Science?
- What strategies do you use to engage and support your students with writing in Amplify Science in a remote/hybrid setting?

Writing in Amplify Science

Purposeful communicative writing is an integral part of the Amplify Science curriculum. Students write daily for many different purposes.



Completed Scientific Argumentation Wall Diagram

Scientific Argumentation

*

* These items were posted in the launch unit.

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

*

Evaluating Evidence

*

Evidence criteria posted in previous units

Evidence is higher quality if it comes from a reliable source.

3.2

Scientific Argument



*

Reasoning Tool

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

*

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).

*

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?

*

Evidence Gradient



*

Example Student Arguments

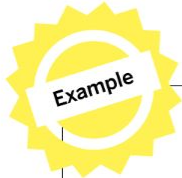
Reasoning Tool

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



Using the Reasoning Tool to Support Your Claim

- Circle your strongest piece of evidence.
- Draw an X over those pieces of evidence that you do not plan to use in your argument.
- Draw an arrow to connect pieces of evidence that go together.



Evidence	This matters because . . . (How does this evidence support the claim?)	Therefore, . . . (claim)
Sample Evidence Card A	Your ideas about how the evidence supports the claim	Your claim
Sample Evidence Card B	Your ideas about how the evidence supports the claim	
Sample Evidence Card C	Your ideas about how the evidence supports the claim	

Exploring Writing Sequence

Directions:

- Download your units investigation notebook from Printable Resources in the Unit Guide for **chapter 1**. Use this to help you identify opportunities for students to write
- Analyze the purpose of each writing opportunity in the chapter.
- Fill out the sheet on page 7 of your participant notebook

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 <ul style="list-style-type: none">● How will the student find this useful?	Purpose for the teacher <ul style="list-style-type: none">● How will you find this helpful?

5 min break



Plan for the day

- Framing the day
 - Welcome and introductions
- Shifts in Science Instruction
 - Revisiting the Amplify Science approach
 - Revisiting Resources
 - Science and Engineering practices
- Science and Literacy
 - Embedded literacy supports
 - Embedded literacy strategies
- **Applying the Strategies through the Science Seminar**
 - Evaluating claims, gathering evidence, and justifying arguments with reasoning
- Reflection and closing





Applying Strategies through the Science Seminar

Science Seminar Sequence



Considering claims
and evidence



Participating in the
Science Seminar



Writing an argument

Science Seminar Sequence



Considering claims
and evidence



Participating in the
Science Seminar



Writing an argument

Goals for the Science Seminar Sequence

- Apply content knowledge (DCI's and CCC's) gained throughout the unit to address a new scientific problem
- Highlight practices: making arguments from evidence, constructing explanations, analyzing data, communicating information
- Three-dimensional assessment opportunity
- Engagement: student-centered, open-ended, novel context
- Nature of science: questions with no clear answer

Claims Students Investigate

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.

To: Student Chemists
From: Dr. Samara Yung, Lead Chemist
Subject: Someone Stole the Lavoisier Diamond!



There's been a robbery at the Westfield Museum! This morning, the museum staff discovered the rare and expensive Lavoisier Diamond was missing. When police arrived, they found a hole had been made in the glass display case where the diamond was stored. Next to the display case, they found a plastic container that was half full with an unknown substance. Police think that the thief may have used some of the substance to make a hole in the glass and may have accidentally left the rest of the substance behind.

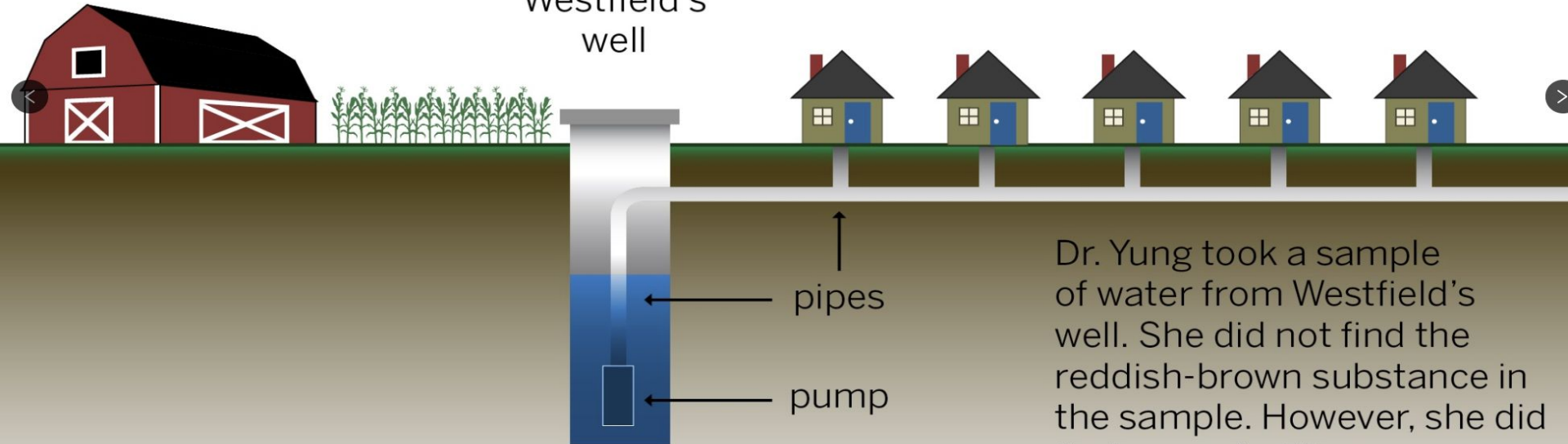
The chief of police has asked me to help them identify this unknown substance and determine who could have used it to steal the Lavoisier Diamond. As you have recent experience in working with the community of Westfield, I am turning the case over to you. I hope you remember what you have learned so far about chemical reactions. I think you will need to use your knowledge to help the police crack this case!

The residents of Westfield found a reddish-brown substance coming out of their water pipes.

nearby farm

Westfield's well

neighborhood of Westfield



Dr. Yung took a sample of water from Westfield's well. She did not find the reddish-brown substance in the sample. However, she did find some fertilizer.

Evaluating Observations of the Unknown Substance

There were four police officers at the crime scene. The officers wrote down their observations of the unknown substance that was used to make a hole in the glass.

1. With a partner, read the observations written down on the Unknown Substance Evidence Cards given to you by your teacher. Annotate the cards with any questions or ideas you have.
2. Discuss the cards with your partner and evaluate each observation using the Evidence Criterion included below.
3. Once you have evaluated each observation, place the cards on the Evidence Gradient sheet with the strongest pieces of evidence near the top and the less strong pieces of evidence near the bottom.
4. When you are finished, answer the questions below.

Evidence Criterion: More detailed observations provide stronger evidence.

Evaluating Evidence

Officer Hodges's observation:

“To me, it looked like water but a little different.”

Chemical Reactions—Unknown Substance Evidence Cards—Lesson 4.1
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Officer Lee's observation:

“At room temperature, it was a liquid, and it smelled awful.”

Chemical Reactions—Unknown Substance Evidence Cards—Lesson 4.1
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Officer Diaz's observation:

“It was a colorless liquid with a strong, irritating odor.”

Chemical Reactions—Unknown Substance Evidence Cards—Lesson 4.1
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Officer Williams's observation:

“I saw a clear liquid that seemed to be dangerous.”

Chemical Reactions—Unknown Substance Evidence Cards—Lesson 4.1
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Officer Hodges's observation:

“To me, it looked like water but a little different.”

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“At room temperature, it was a liquid, and it smelled awful.”

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Officer Williams's observation:

“I saw a clear liquid that seemed to be dangerous.”

Chemical Reactions—Unknown Substance Evidence Cards—Lesson 4.1
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Evidence Gradient

stronger

less strong

Which officer provided the strongest evidence?

Officer Hodges

Officer Lee

Officer Diaz

Officer Williams

Explain why you think this officer's observations provided the strongest evidence.

List of Corrosive Substances

Substance name	Properties
hydrobromic acid	<ul style="list-style-type: none">• faint yellow color• strong, irritating odor• liquid at room temperature
hydrofluoric acid	<ul style="list-style-type: none">• colorless• strong, irritating odor• liquid at room temperature
iodine monochloride	<ul style="list-style-type: none">• dark red color• strong, irritating odor• liquid at room temperature
perchloric acid	<ul style="list-style-type: none">• colorless• odorless• liquid at room temperature

Which of these substances do you think is the unknown substance the criminal used to make a hole in the glass?

Hydrobromic acid

Hydrofluoric acid

Iodine monochloride

Perchloric acid

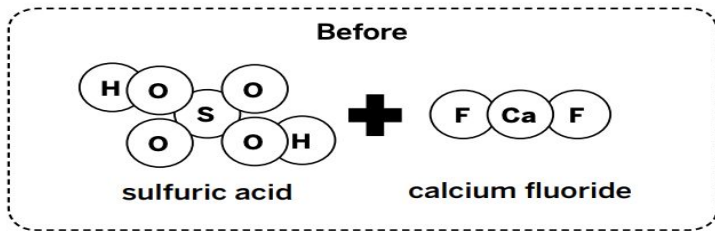
Explain your answer.

Making Hydrofluoric Acid

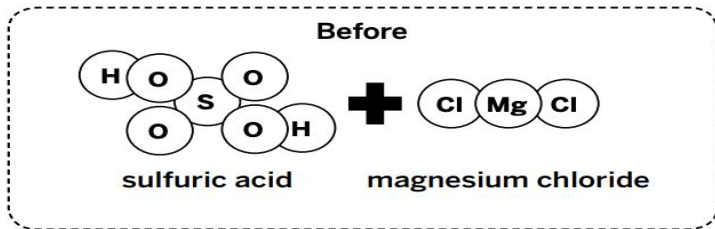
Goal: Create atomic-scale models that show whether or not each of the suspects could have produced hydrofluoric acid.



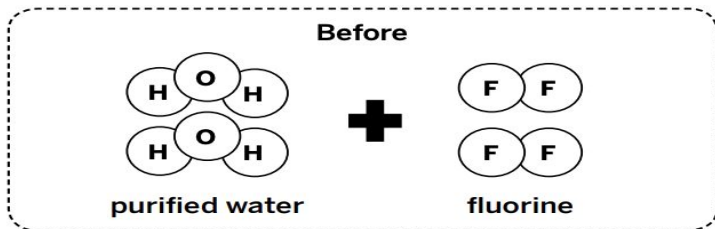
Pat



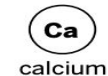
Alex




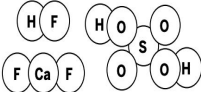

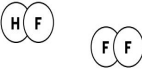
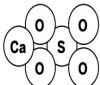

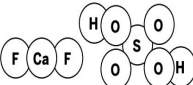

Tracy



Key



Sorting Evidence

<p>Evidence Pat made the hydrofluoric acid:</p>	<p>Evidence Tracy made the hydrofluoric acid:</p>	<p>Evidence Card A</p> <p>When the police searched Pat's house, they found some calcium sulfate (CaSO_4).</p>  <p><small>Chemical Reactions—Suspect Evidence Cards—Lesson 4.2 © 2016 The Regents of the University of California</small></p>	<p>Evidence Card B</p> <p>The police did not find hydrofluoric acid (HF), sulfuric acid (H_2SO_4), or calcium fluoride (CaF_2) in Pat's house.</p>  <p><small>Chemical Reactions—Suspect Evidence Cards—Lesson 4.2 © 2016 The Regents of the University of California</small></p>	<p>Evidence Card C</p> <p>When the police searched Tracy's house, they found some purified water (H_2O).</p>  <p><small>Chemical Reactions—Suspect Evidence Cards—Lesson 4.2 © 2016 The Regents of the University of California</small></p>	<p>Evidence Card D</p> <p>The police did not find hydrofluoric acid (HF), fluorine (F_2), or any other unusual substances in Tracy's house.</p>  <p><small>Chemical Reactions—Suspect Evidence Cards—Lesson 4.2 © 2016 The Regents of the University of California</small></p>
<p>Evidence Pat did not make the hydrofluoric acid:</p>	<p>Evidence Tracy did not make the hydrofluoric acid:</p> <p><small>Chemical Reactions—Evidence Sorting Grid—Lesson 4.2 © 2016 The Regents of the University of California</small></p>	<p>Evidence Card E</p> <p>According to Dr. Yung, calcium sulfate (CaSO_4) is a substance commonly used in sculpting.</p>  <p><small>Chemical Reactions—Suspect Evidence Cards—Lesson 4.2 © 2016 The Regents of the University of California</small></p>	<p>Evidence Card F</p> <p>According to Dr. Yung, oxygen (O_2) is a colorless, odorless gas that is commonly found in air.</p>  <p><small>Chemical Reactions—Suspect Evidence Cards—Lesson 4.2 © 2016 The Regents of the University of California</small></p>	<p>Evidence Card G</p> <p>The chemical supply company confirmed the delivery of sulfuric acid (H_2SO_4) and calcium fluoride (CaF_2) to Pat's house.</p>  <p><small>Chemical Reactions—Suspect Evidence Cards—Lesson 4.2 © 2016 The Regents of the University of California</small></p>	<p>Evidence Card H</p> <p>The chemical supply company confirmed the delivery of purified water (H_2O) and fluorine (F_2) to Tracy's house.</p>  <p><small>Chemical Reactions—Suspect Evidence Cards—Lesson 4.2 © 2016 The Regents of the University of California</small></p>

Sorting New Evidence


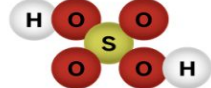






Sorting Through New Evidence

Based on your models, the police obtained search warrants for Pat and Tracy's houses. They were able to find new evidence about the substances in each of their houses.








Instructions:

1. Examine the Suspect Evidence Cards, annotating with any questions or ideas you have. If useful, you may also color in the atoms on the cards using the atom key below.
2. Review the Modeling Tool sheet you completed in the last activity. Consider how the information in the Suspect Evidence Cards might relate to your completed Modeling Tool sheet. You may revise your model if needed.
3. As you sort the cards using the Evidence Sorting Grid sheet given to you by your teacher, discuss your choices with your partner. If you think a card belongs in more than one category, place it on the line between those two categories. If you are not sure which category a card belongs in, set that card to the side.

Substance Reference Guide



<p>hydrofluoric acid</p> <p>repeating group of atoms: HF</p> 	<p>sulfuric acid</p> <p>repeating group of atoms: H₂SO₄</p> 	<p>calcium fluoride</p> <p>repeating group of atoms: CaF₂</p> 
<p>magnesium chloride</p> <p>repeating group of atoms: MgCl₂</p> 	<p>purified water</p> <p>repeating group of atoms: H₂O</p> 	<p>fluorine</p> <p>repeating group of atoms: F₂</p> 
<p>calcium sulfate</p> <p>repeating group of atoms: CaSO₄</p> 	<p>oxygen</p> <p>repeating group of atoms: O₂</p> 	

Atom Key

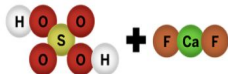
 H	 O	 S	 Cl	 Mg	 F	 Ca
hydrogen	oxygen	sulfur	chlorine	magnesium	fluorine	calcium

Identifying the Primary Suspect

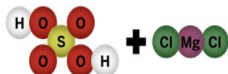
Based on how you sorted the Suspect Evidence Cards with your partner, answer the questions below. Remember that you will have a chance to change your mind in the next lesson.

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



hydrogen



oxygen



sulfur



chlorine



magnesium



fluorine



calcium

Based on what you know so far, which suspect do you think is most likely to have made the hydrofluoric acid?

Pat

Alex

Tracy



Not sure

Explain your answer using at least one piece of evidence from your Suspect Evidence Cards.

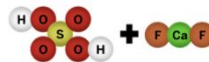
Preparing for the Seminar

Preparing Your Science Seminar Argument

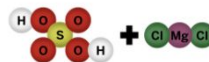
1. With your partner, take turns sharing which claim you think is the most convincing and why.
2. Use your Warm-Up responses and the Scientific Argumentation Sentence Starters on the scientific argumentation wall for help.
3. Refer to the Suspect Evidence Cards and claims below as needed.

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

hydrogen

O

oxygen

S

sulfur

Cl

chlorine

Mg

magnesium

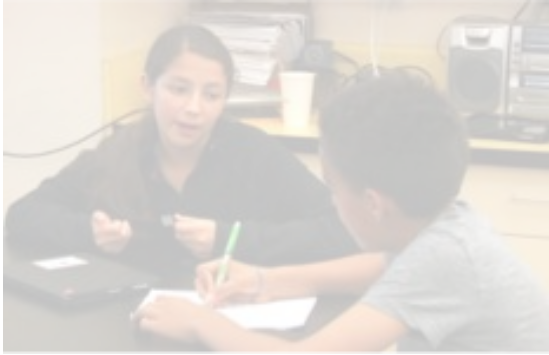
F

fluorine

Ca

calcium

Science Seminar Sequence



Considering claims
and evidence



Participating in the
Science Seminar



Writing an argument

Science Seminar expectations

Students are expected to:

- Run the conversation.
- Use evidence to support ideas.
- Explain their thinking.
- Listen to one another.
- Respond to one another.
- Be open to changing their minds.



Science Seminar seating

Class arrangement:

- Half the class sits in the inner semicircle.
- The other half of the class sits in the outer semicircle.



Science Seminar Observations

Write a check mark in the right-hand column every time you hear one of your peers say or do something listed in the left-hand column. If you hear an interesting idea, write it in the last row of the table.

OBSERVATIONS DURING THE SEMINAR	CHECK MARKS
I heard a student use evidence to support a claim.	
I heard a student respectfully disagree with someone else's thinking.	
I heard a student explain how her evidence is connected to her claim.	
I heard a student evaluate the quality of evidence.	
I heard an idea that makes me better understand one of the claims. That idea is: _____ _____	

Scaffolding Talk

Add a new idea with evidence:

- I think _____ because...
- My evidence is...

Agree/Disagree and use evidence:

- I agree/disagree with _____ because...
- I am now convinced that _____ because...

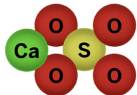
Ask a question

- What is your evidence?
- Given this evidence, how sure are you? How could you be more sure?
- Do you agree or disagree with what _____ said?
- I have a question for _____ about...
- Could you say more about that?
- Could you give us an example?
- I wonder...

Participating in the Seminar

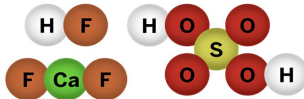
Evidence Card A

When the police searched Pat's house, they found some calcium sulfate (CaSO_4).



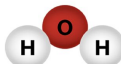
Evidence Card B

The police did **not** find hydrofluoric acid (HF), sulfuric acid (H_2SO_4), or calcium fluoride (CaF_2) in Pat's house.



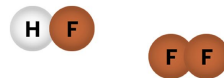
Evidence Card C

When the police searched Tracy's house, they found some purified water (H_2O).



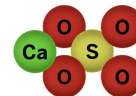
Evidence Card D

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.



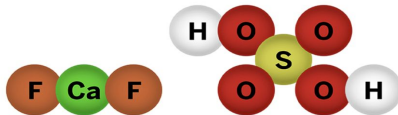
Evidence Card F

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.

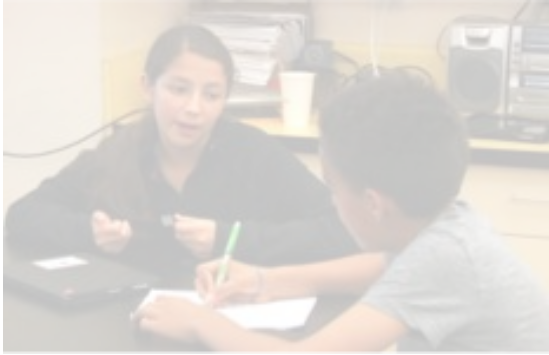


Evidence Card H

The chemical supply company confirmed the delivery of purified water (H_2O) and fluorine (F_2) to Tracy's house.



Science Seminar Sequence



Considering claims
and evidence



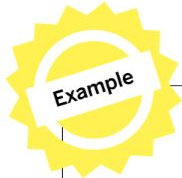
Participating in the
Science Seminar



Writing an argument

Using the Reasoning Tool to Support Your Claim

- Circle your strongest piece of evidence.
- Draw an X over those pieces of evidence that you do not plan to use in your argument.
- Draw an arrow to connect pieces of evidence that go together.



Evidence	This matters because . . . (How does this evidence support the claim?)	Therefore, . . . (claim)
Sample Evidence Card A	Your ideas about how the evidence supports the claim	Your claim
Sample Evidence Card B	Your ideas about how the evidence supports the claim	
Sample Evidence Card C	Your ideas about how the evidence supports the claim	

Science Seminar Reflection

How do students use literacy practices to:

- make and evaluate claims
- gather evidence
- justify arguments with relevant reasoning



Considering
claims & evidence



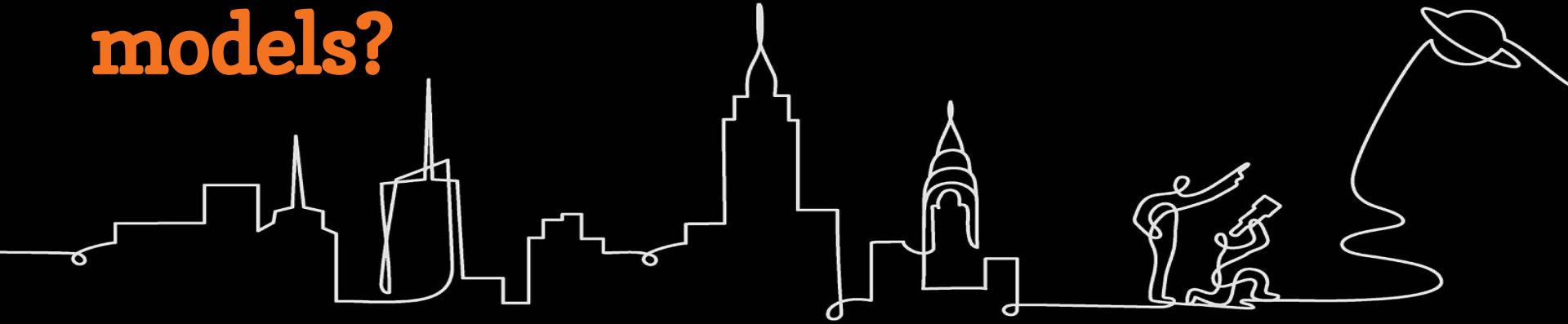
Participating in the
Science Seminar



Writing an
argument

Reflect-Type-Chat! Share and Learn

How can you adapt the science seminar or how have you adapted for remote and hybrid instructional models?



Science seminar and distance learning

- If possible, have an online discussion. Set discussion normals.
- If needed, use a collaborative document (Google docs, Padlet, Jamboard) for virtual, asynchronous student discussion
- Use existing student supports (sentence stems, science seminar guidelines)
- Create digital evidence cards (Google slides, Padlet, Jamboard) and have students sort them
- Have students share their screens to visually support the evidence they share
- Consider leading seminars in smaller groups
- See @Home Units for guidance
- Have students prepare independently or in partners

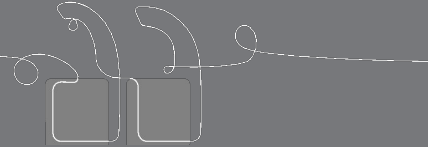
Plan for the day

- Framing the day
 - Welcome and introductions
- Shifts in Science Instruction
 - Revisiting the Amplify Science approach
 - Revisiting Resources
 - Science and Engineering practices
- Science and Literacy
 - Embedded literacy supports
 - Embedded literacy strategies
- Applying the Strategies through the Science Seminar
 - Evaluating claims, gathering evidence, and justifying arguments with reasoning
- Reflection and closing



Revisiting Our Objectives:

- Focus on the shifts in emphasizing the Science and Engineering practices which require students to read and write like scientists.
- Identify embedded strategies for explicit literacy support.
- Understand how these strategies help students make and evaluate claims, gather evidence, and justify arguments with relevant reasoning.
- Engage in reflection on how a science seminar structures opportunities for verbal and written argumentation.



Revisiting our objectives

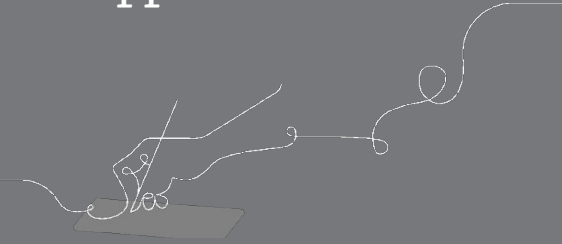
Do you feel ready to...

- Focus on the shifts in emphasizing the Science and Engineering practices which require students to read and write like scientists.
- Identify embedded strategies for explicit literacy support.
- Understand how these strategies help students make and evaluate claims, gather evidence, and justify arguments with relevant reasoning.
- Engage in reflection on how a science seminar structures opportunities for verbal and written argumentation.

1- I'm not sure how I'm going to do this!

3- I have some good ideas but still have some questions.

5- I have a solid plan for how to make this work!



Questions?

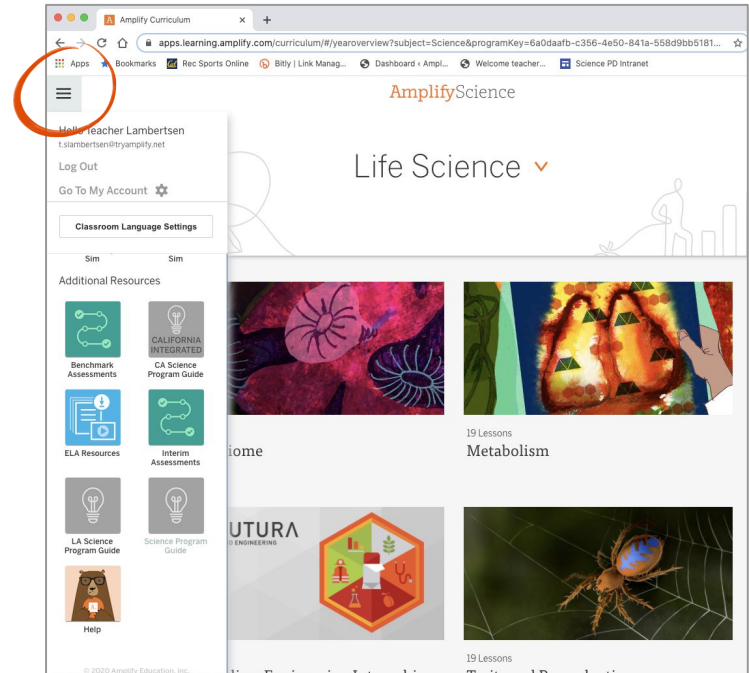


Amplify Science Program Hub

A new hub for Amplify Science resources

- **Videos and resources to continue getting ready to teach**
- Amplify@Home resources
- Keep checking back for updates

science.amplify.com/programhub



New York City Resources Site

<https://amplify.com/resources-page-for-nyc-6-8/>



Amplify.

Amplify Science Resources for NYC (6-8)



THE LAWRENCE
HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

Welcome! This site contains supporting resources designed for the New York City Department of Education Amplify Science adoption for grades 6–8.

[Educator Spotlight Submission](#)

[20-21 Login Update](#)

[Professional learning opportunities](#)

[Introduction](#)



Contact Us

88

Started resources

Educator Spotlight Submission

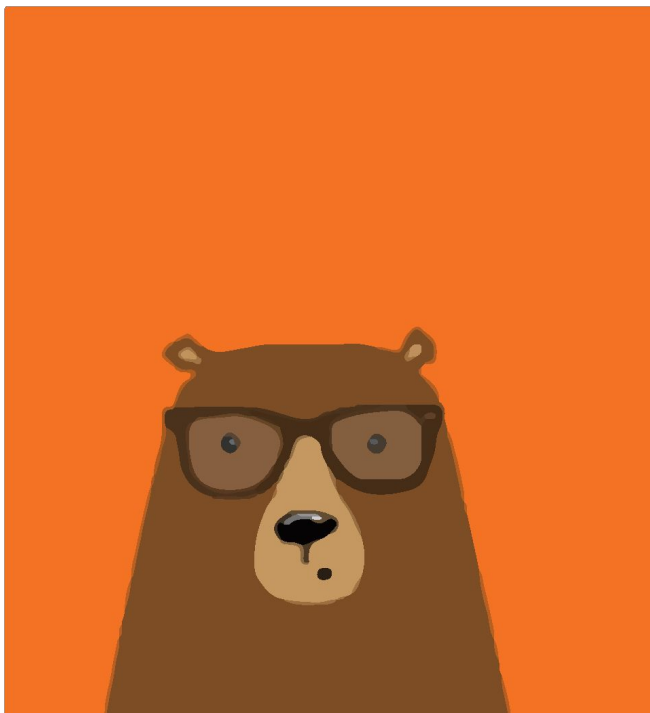
Calling all NYC DOE educators! Do you know an educator who has gone above and beyond? Would you like to highlight your teaching experience for others? [Submit nominations here](#) to see them featured as a spotlight in a future edition of our monthly newsletter and on our Instagram pages!

Site Resources

- Login information
- Pacing guides
- Getting started guide
- NYC Companion Lessons
- **Resources from PD sessions**
- And much more!

Amplify.

Additional Amplify resources



Program Guide

Glean additional insight into the program's structure, intent, philosophies, supports, and flexibility.

<https://my.amplify.com/programguide/content/national/welcome/science/>

Amplify Help

Find lots of advice and answers from the Amplify team.

my.amplify.com/help

Additional Amplify Support

Customer Care

Seek information specific to enrollment and rosters, technical support, materials and kits, and teaching support, weekdays 7AM-7PM EST.



scihelp@amplify.com



800-823-1969



Amplify Chat

When contacting the customer care team:

- Identify yourself as an Amplify Science user.
- Note the unit you are teaching.
- Note the type of device you are using (Chromebook, iPad, Windows, laptop).
- Note the web browser you are using (Chrome or Safari).
- Include a screenshot of the problem, if possible.
- Copy your district or site IT contact on emails.