Middle school course curriculum structure

Middle School Curriculum New York City Edition

Grade 6

- Launch: Harnessing Human Energy
- Thermal Energy
- Populations and Resources
- Matter and Energy in Ecosystems
- Weather Patterns
- Ocean, Atmosphere,and Climate
- 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

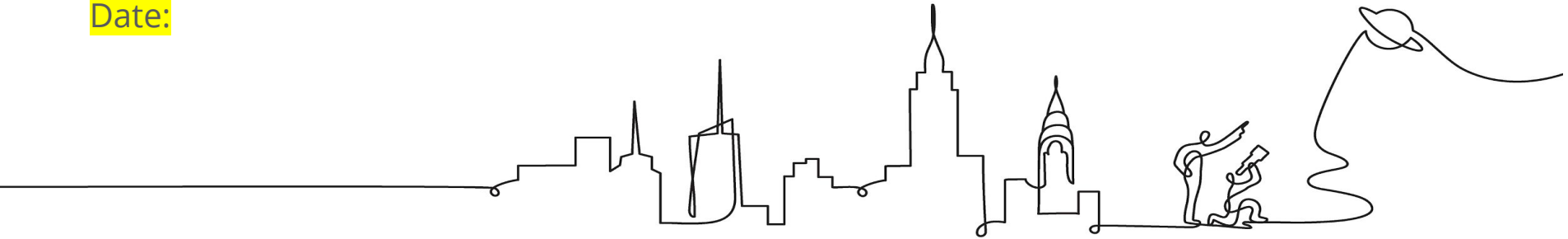
- Launch: Geology on Mars
- Earth, Moon, and Sun
- Force and Motion
- Engineering Internship: Force and Motion
- Magnetic Fields
- Light Waves
- Traits and Reproduction
- Natural Selection
- Evolutionary History

Amplify Science
New York City

Amplify Science Planning for Next Year

Instructional Leads session

Presenter Name:
Date:



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?"*

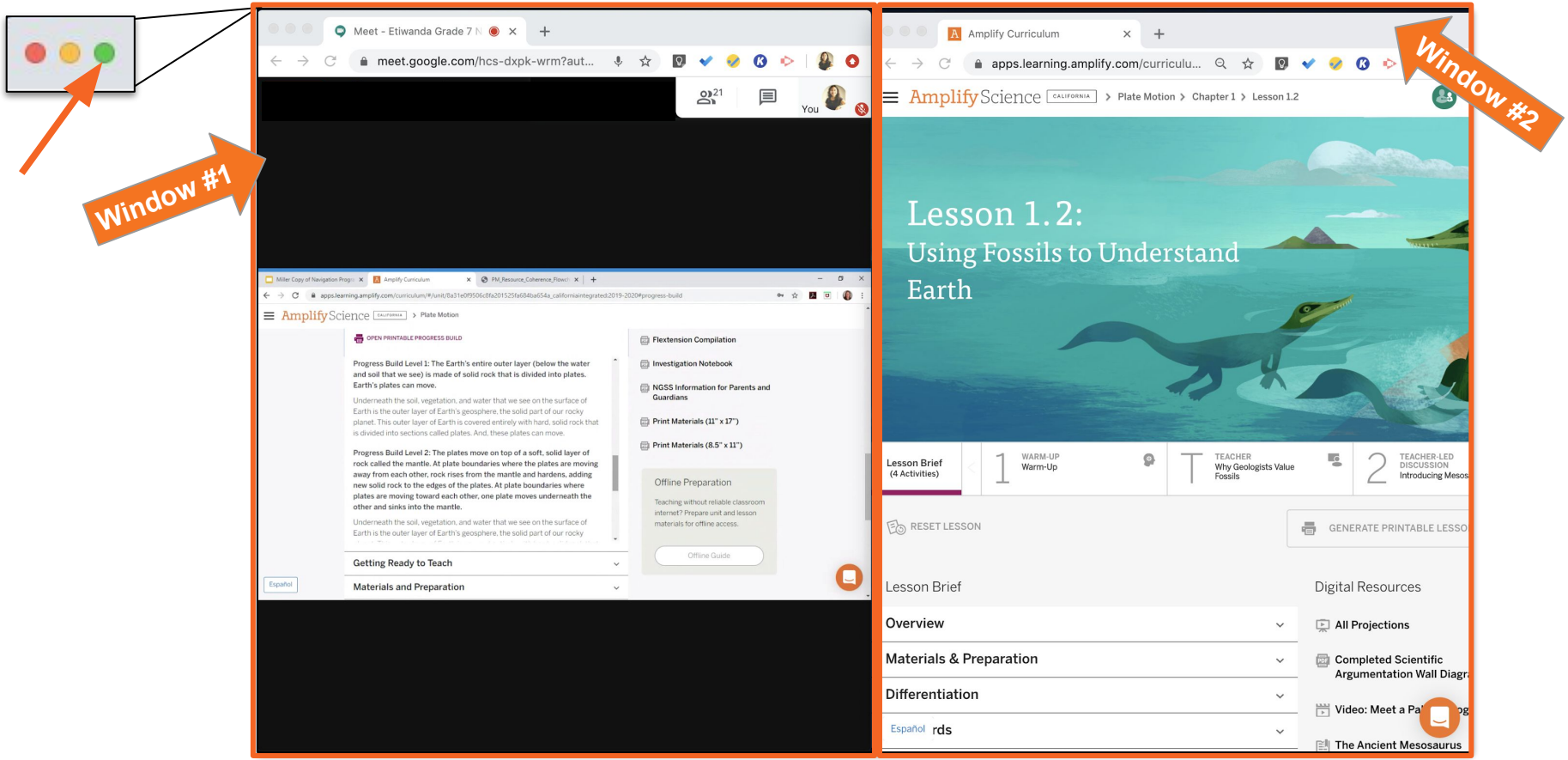
Mute your microphone to reduce background noise unless sharing with the group

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!

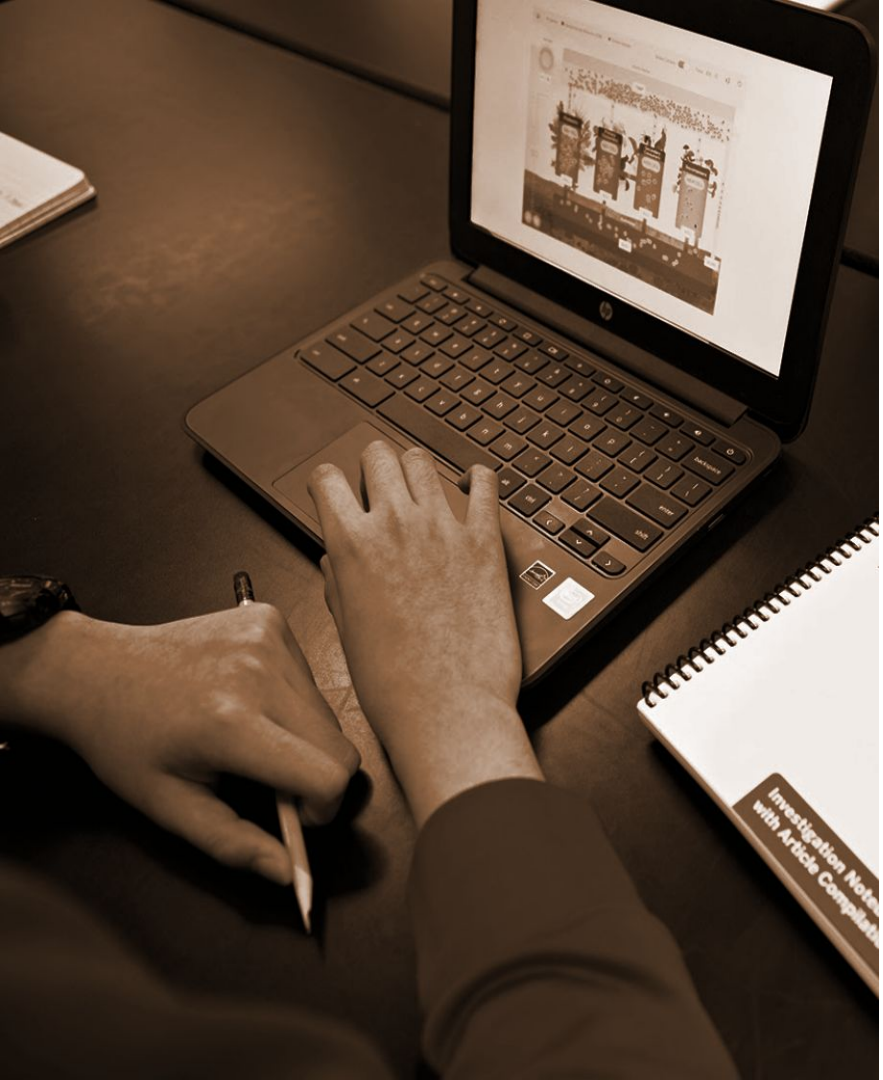
Use two windows for today's webinar



Overarching goals

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

- Reflect on your borough's implementation of Amplify Science in the targeted areas of digitally-enhanced learning, supporting diverse learners, & disciplinary literacy.
- Utilize these reflections to collaborate on focused revisions for an Amplify Science Multimodal look-for tool.



Plan for the day

- **Framing the day**
  - **Welcome and introductions**
  - **Anticipatory activity**
- Targeted Implementation Reflection
  - Digitally-enhanced learning
    - Remote/Hybrid Resources Utilization
  - Reaching diverse learners
    - Utilizing Embedded Assessments
    - Culturally Linguistically Responsive Teaching
  - Science & Literacy
    - Accessing Complex Texts
    - Supporting Academic Discourse
    - Writing In Science
- Guided Planning
  - Amplify Science Multimodal Look-For Tool
    - Collaborative revisions
- Closing
  - Reflection & additional resources
  - Survey

Anticipatory activity

Reflect & share

- Review teacher **self-assessment**
- Then, on the **Jamboard**, "post" the **"I do"** statement you identify as the **greatest overall strength & challenge** for the teachers you've worked with

Step #1

Page 1

Self-inventory: choosing an area of focus for planning

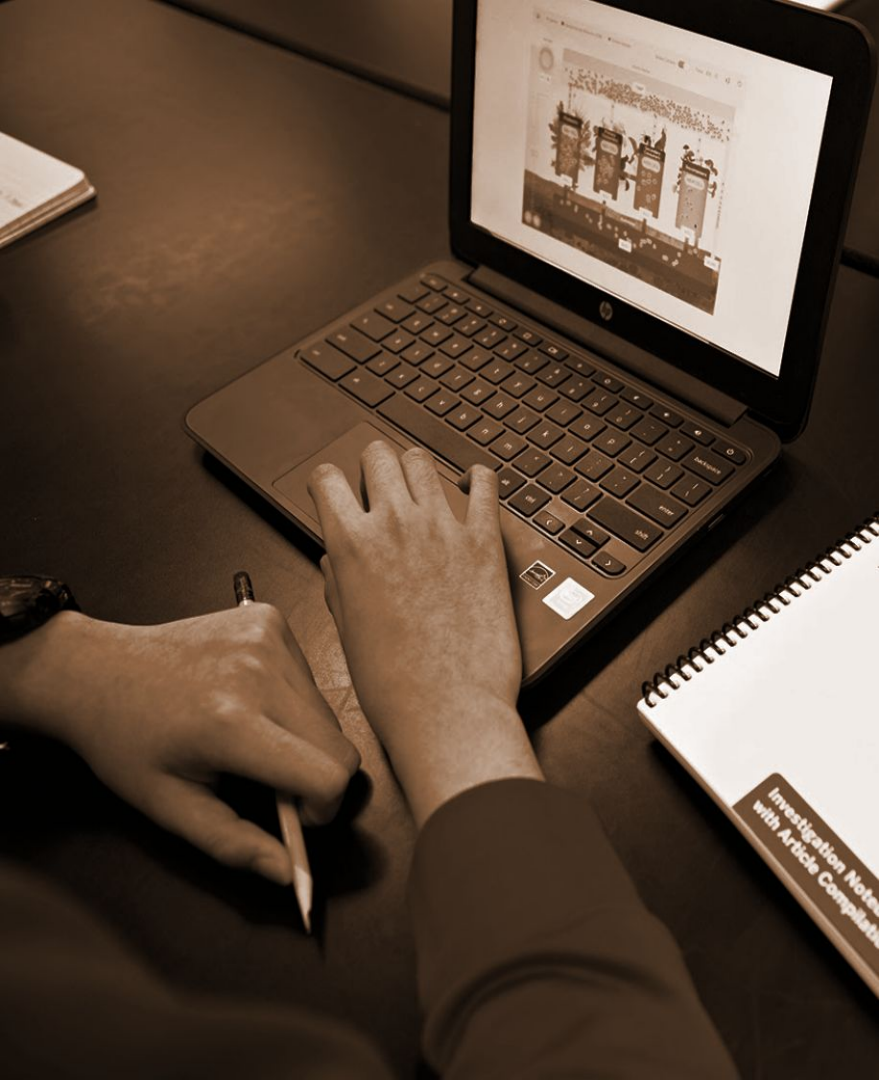
Directions: Use the statements to help guide your areas of strength & support for guided planning.

Statements	I don't	I try	I do
1. I can utilize **digital resources** to enhance instruction.			
2. I can administer **assessments embedded** within instruction.			
3. I can utilize **data** gathered from **formative assessments** to guide my instruction.			
4. I can adjust my instruction to respond to the unique **cultural & linguistic** needs, strengths, and backgrounds of my students.			
5. I can support my students in deconstructing **complex scientific texts** in order to bolster scientific understanding			
6. I can implement **discourse routines** in order to support students developing scientific understanding.			
7. I can adjust **questioning strategies** to support students' scientific inquiry.			
8. I can scaffold students writing of **scientific arguments** & explanations.			

Jamboard

Step #2

Questions?



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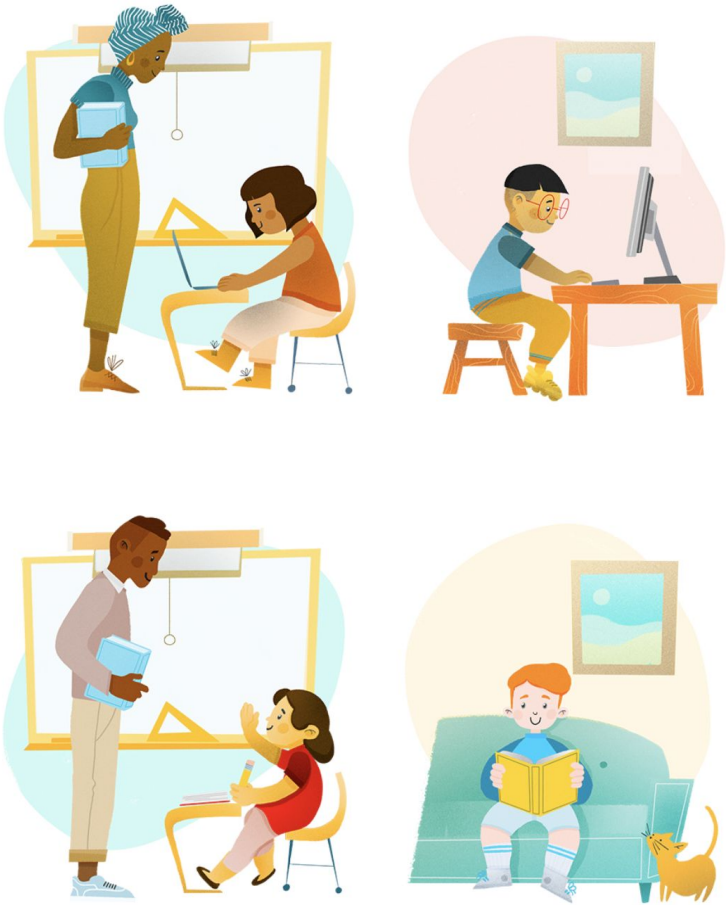
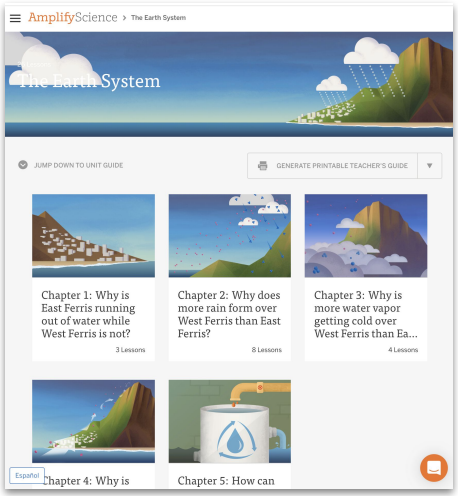
AmplifyScience@Home

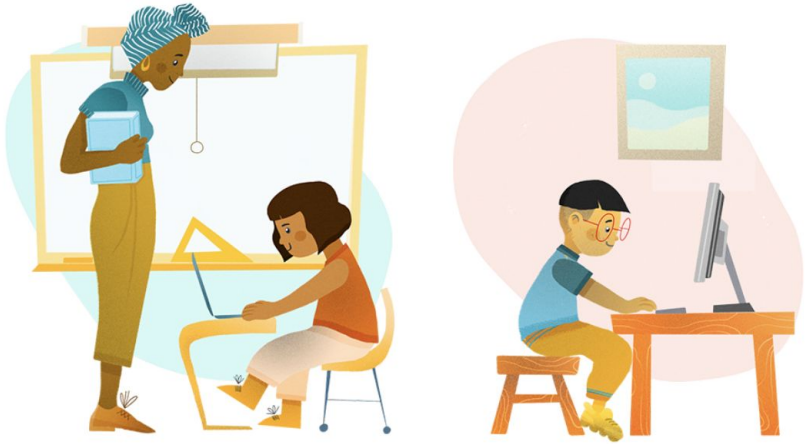
A suite of resources designed to make extended remote and hybrid learning easier for teachers and students.



Resource options



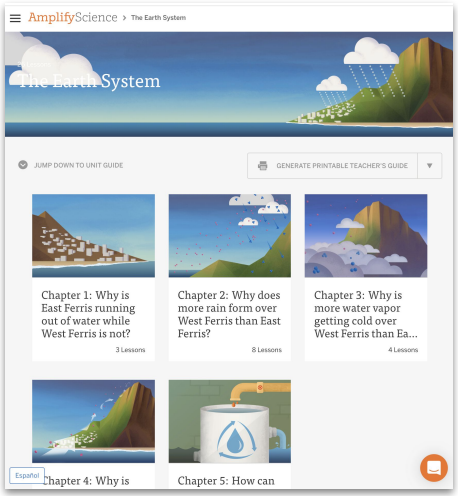
Original Amplify Science curriculum



Amplify Science@Home

Resource options

Related but unique resources



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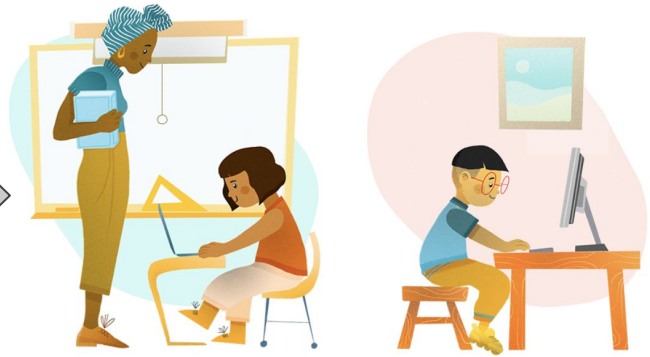

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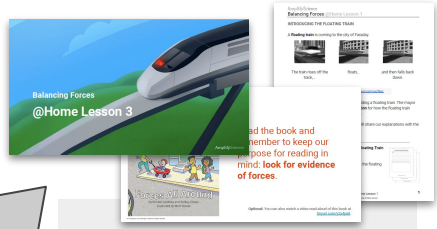
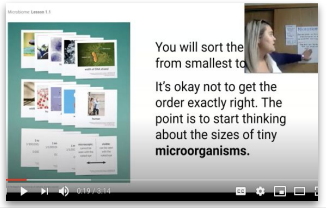


@Home Units



@Home Videos

Targeted reflection

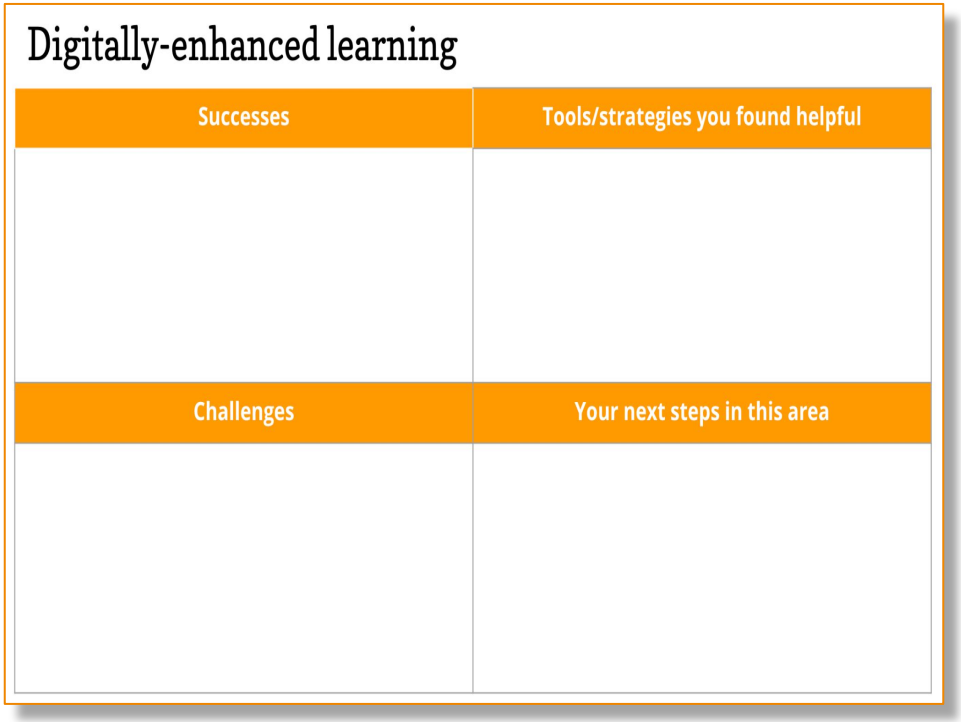
We'll reflect on each area, following this structure:

- Brief overview of area/topic
- Model activity
- Reflect & share insights

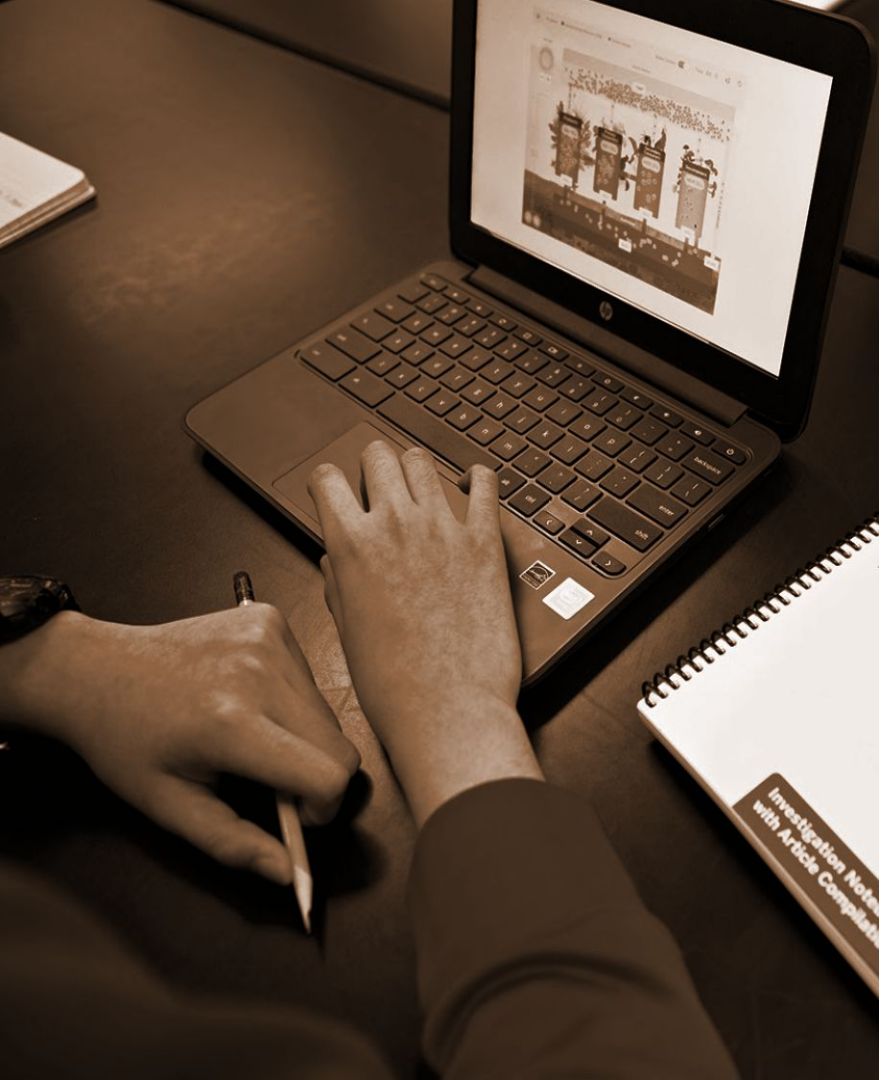
Collaborative reflection: digitally-enhanced learning

On the slides, enter:

- Successes
- Tools & strategies you found helpful
- Challenges
- Your next steps in this area



Questions?



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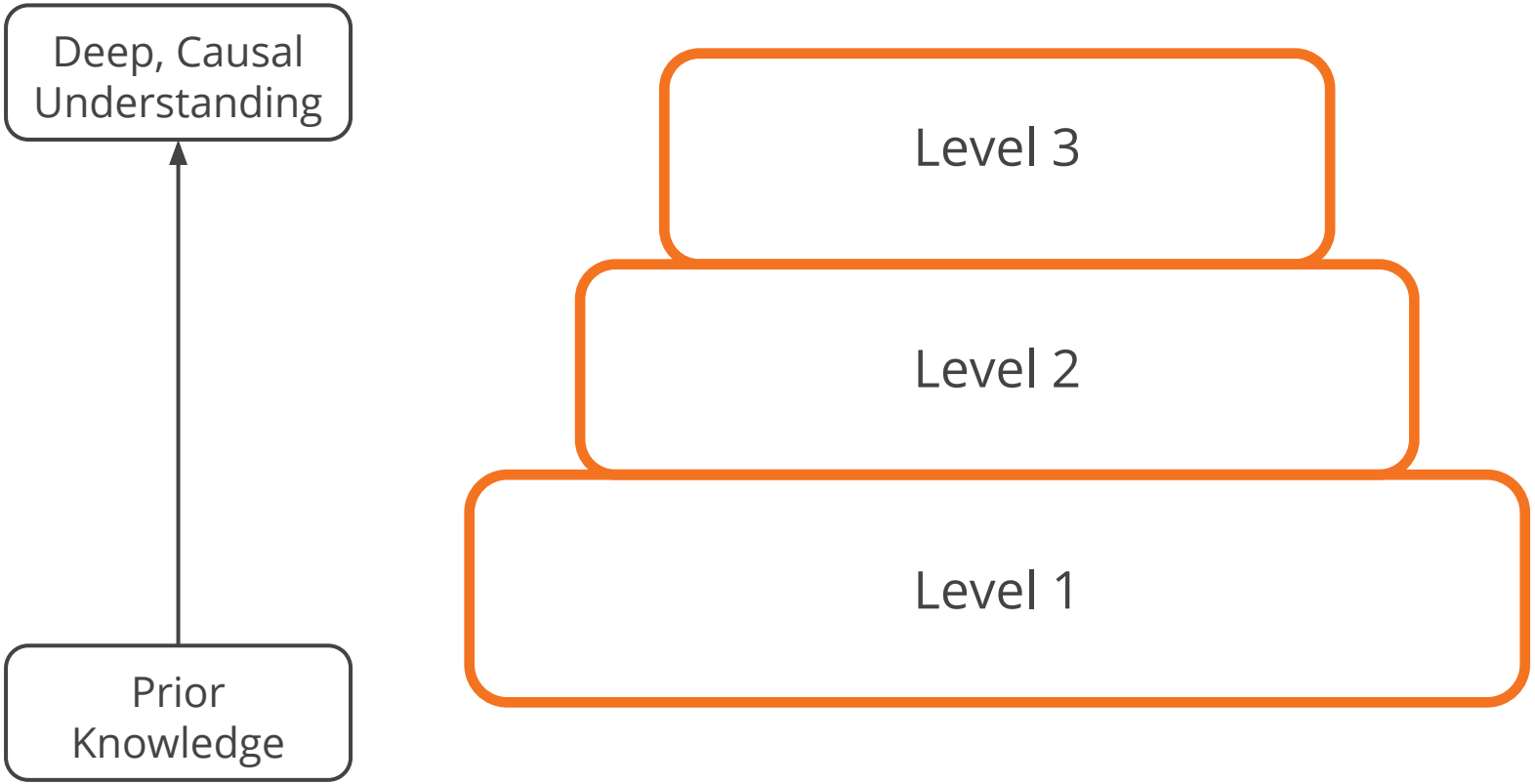
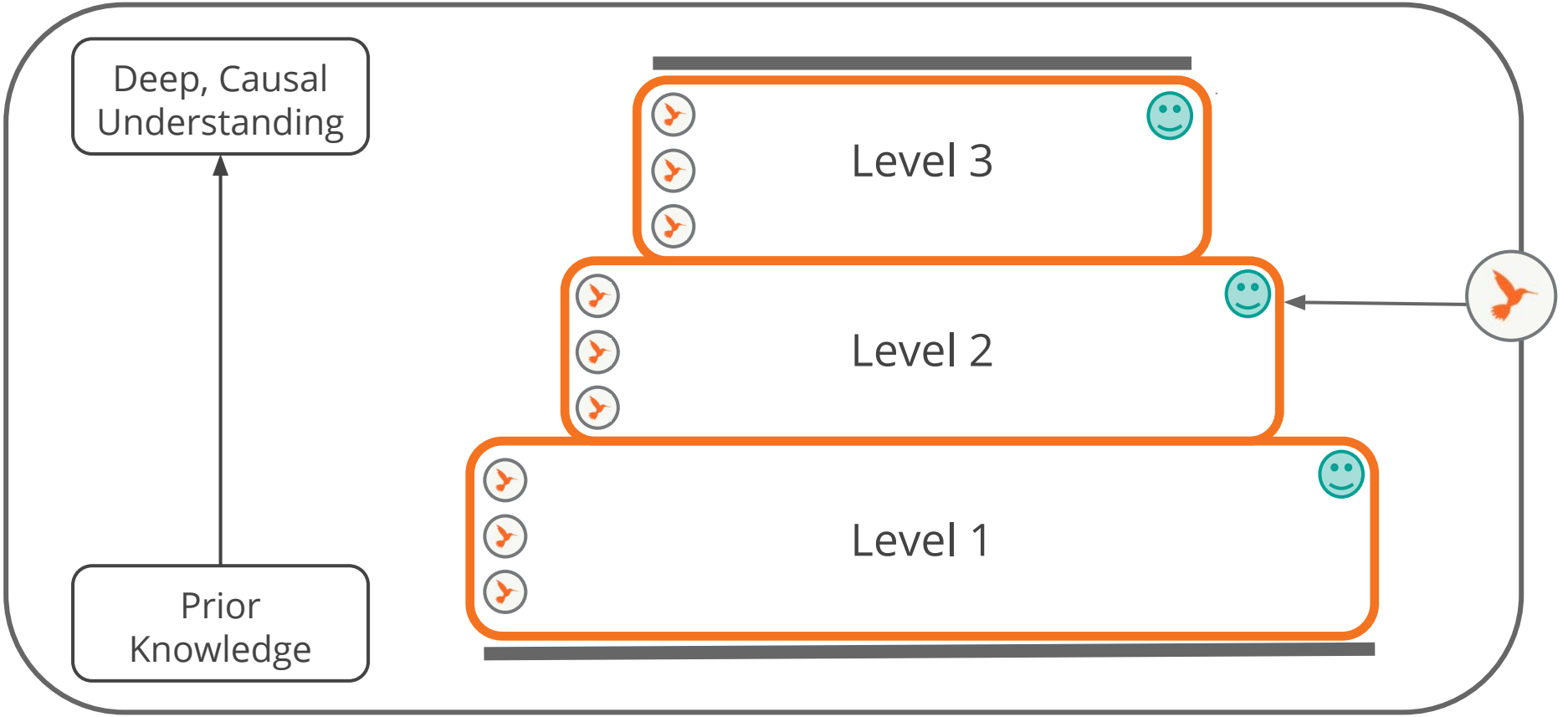
Utilizing Embedded Assessments

Progress Build: A unit-specific learning progression



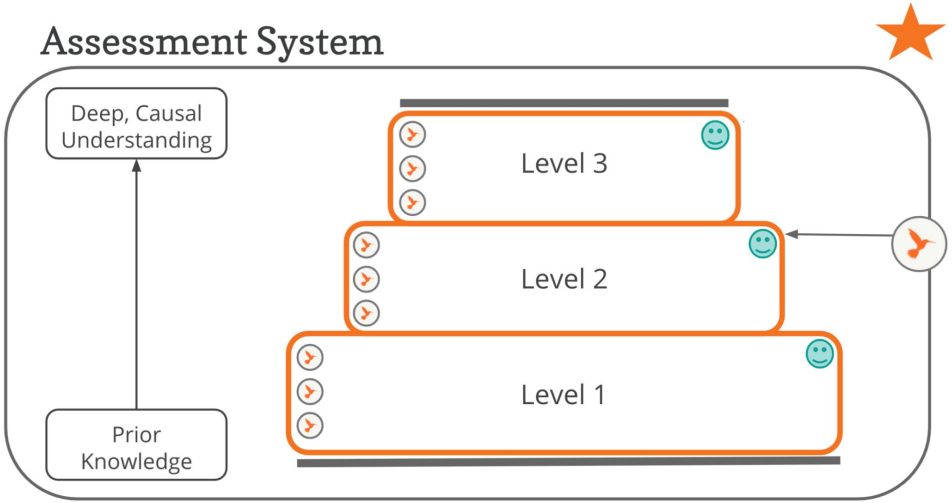
Assessment System



Assessment System Reflection

There are many assessment opportunities in each Amplify Science unit.

Question: What does having this quantity of assessment opportunities do for students? For teachers?



On-the-Fly Assessments

- Occurs throughout the lessons
- Three-dimensional tasks that span a range of modalities
- Provides evidence of how a student is coming to understand core concepts and developing dexterity with SEPs and CCCs
- Designed to help a teacher make sense of student activity during a learning experience
- Contains Look For / Now What resource for analyzing student responses

Collecting Data

How do you typically collect and record student data?

What strategies have you successfully used for collecting data in a remote learning setting ?

Data Collection Tool Sample

Lesson 1.5 Activity 3: Modeling the Relationship Between Atmosphere and Climate

Look For 1: Shows correct atmospheric trends
Look For 2: Shows trends correlate with increased surface energy absorption

(X indicates student did not demonstrate Look For.)

Student	LF1	LF2	Notes
Samya	X		CO_2 decreasing
Devon	X		High amounts of sulfur dioxide, then high amounts of methane
Iyakiel			
Dantaijia			
Samuel		X	Increasing CO_2, but decreasing energy absorption
Alexcya			
Sallie	X		Showed increasing sulfur dioxide
Nevaeh B.	X	X	Decreasing methane and decreasing energy absorption. Explanation said that the air is hotter, so the surface must be cooler.
Salvador			
Yanailis			
Michelle			
Nevaeh Y.			
Corey			
Khadijah			
Victoria			
Kalil			
Andrew			
Kai'Aisja			
Nehemiah			
Oscar			

Questions?

Culturally Linguistically Responsive Teaching

The Amplify Science curriculum was developed with supporting diverse learning needs in mind.

Two overarching conceptual frameworks informed Amplify Science's approach to ensuring access and equity for all students:

Universal Design for Learning & Culturally Linguistically Responsive Teaching.

Culturally and linguistically responsive teaching

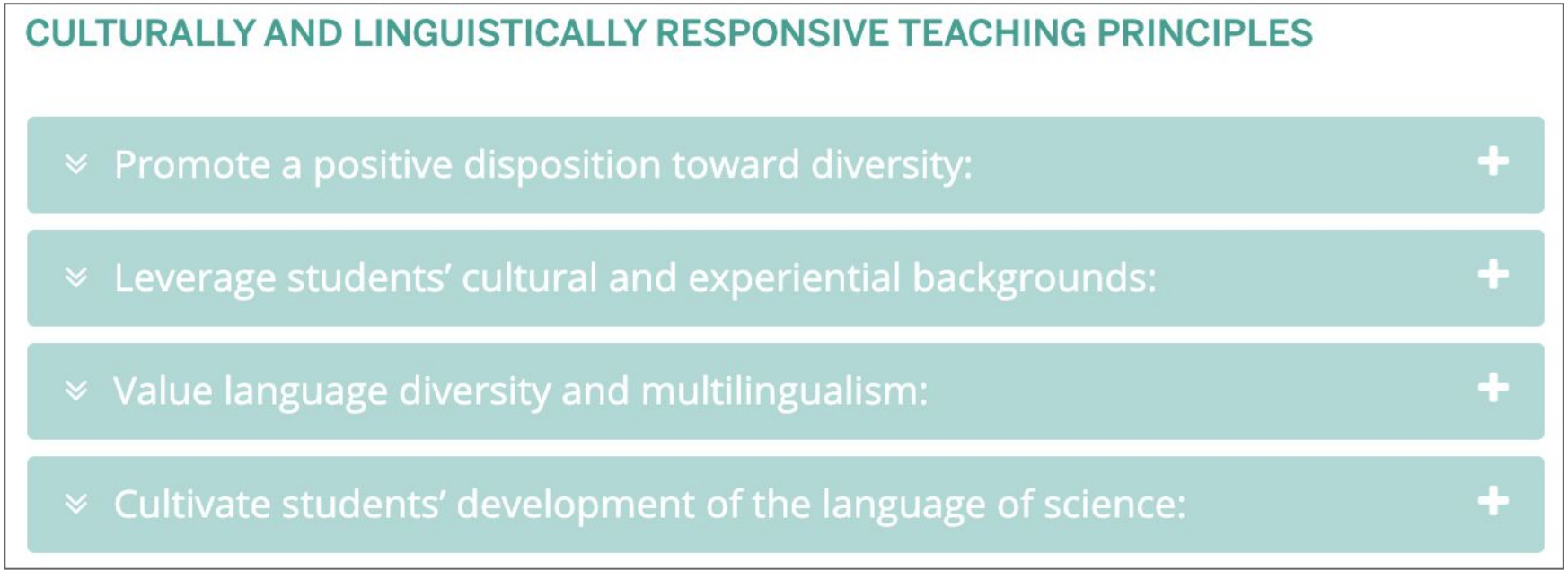
Culturally and linguistically responsive teaching (CLRT) principles **emphasize validating and valuing students' cultural and linguistic heritage** and **creating positive and nurturing learning environments** so that learning is more effective.

Source: (l): Aaron Yaazie; (um): Kyle Spradley/ University of Missouri; (lm) Dr. Grace O'Connell; (ur) Jane Rigby; (lr) Tina Shelton/ John A. Burns/ University of Hawaii at Manoa

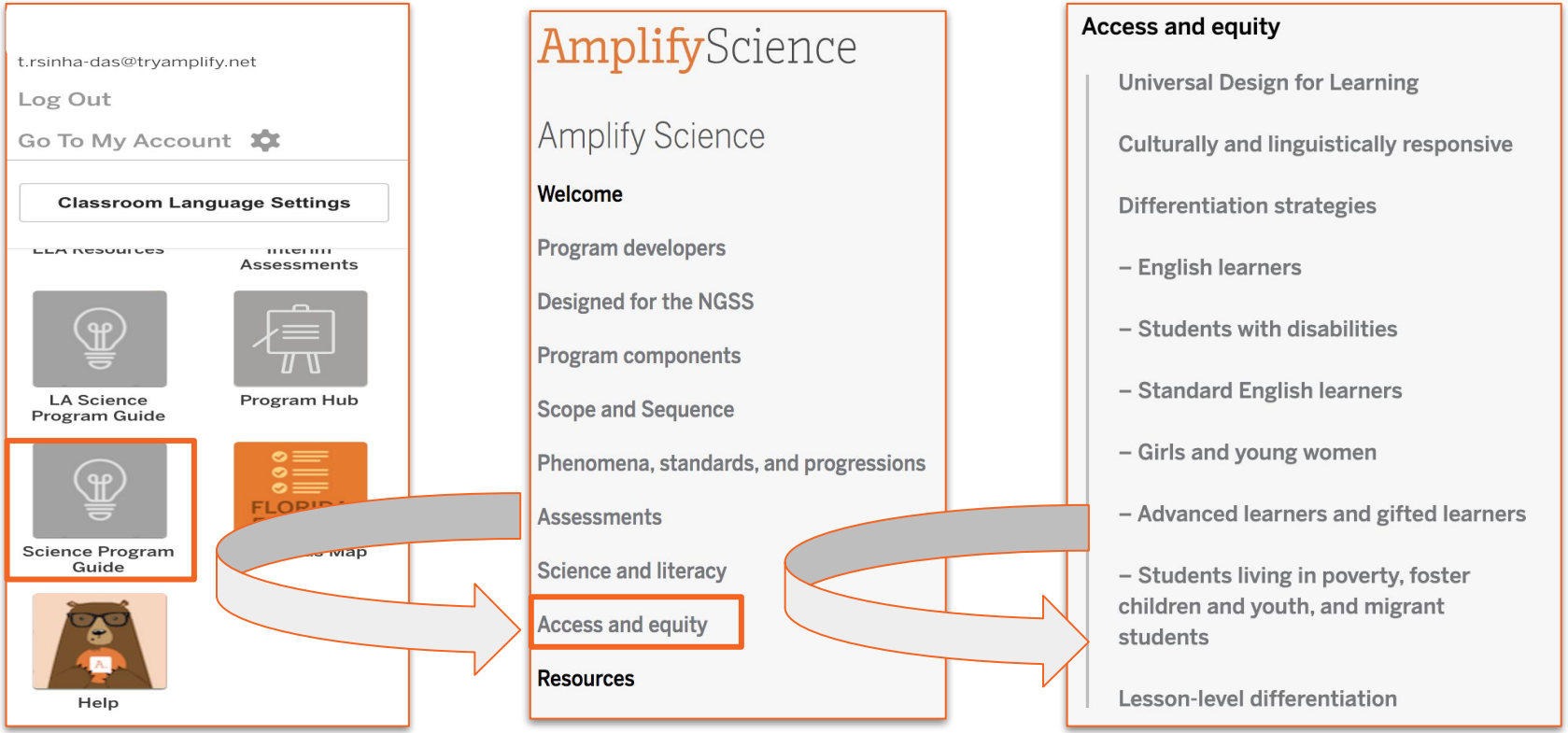
Access and Equity

Culturally and linguistically responsive teaching

Think, type, chat: What have you leveraged from the Amplify curriculum to support culturally and linguistically responsive teaching?



Differentiation strategies to support ALL students



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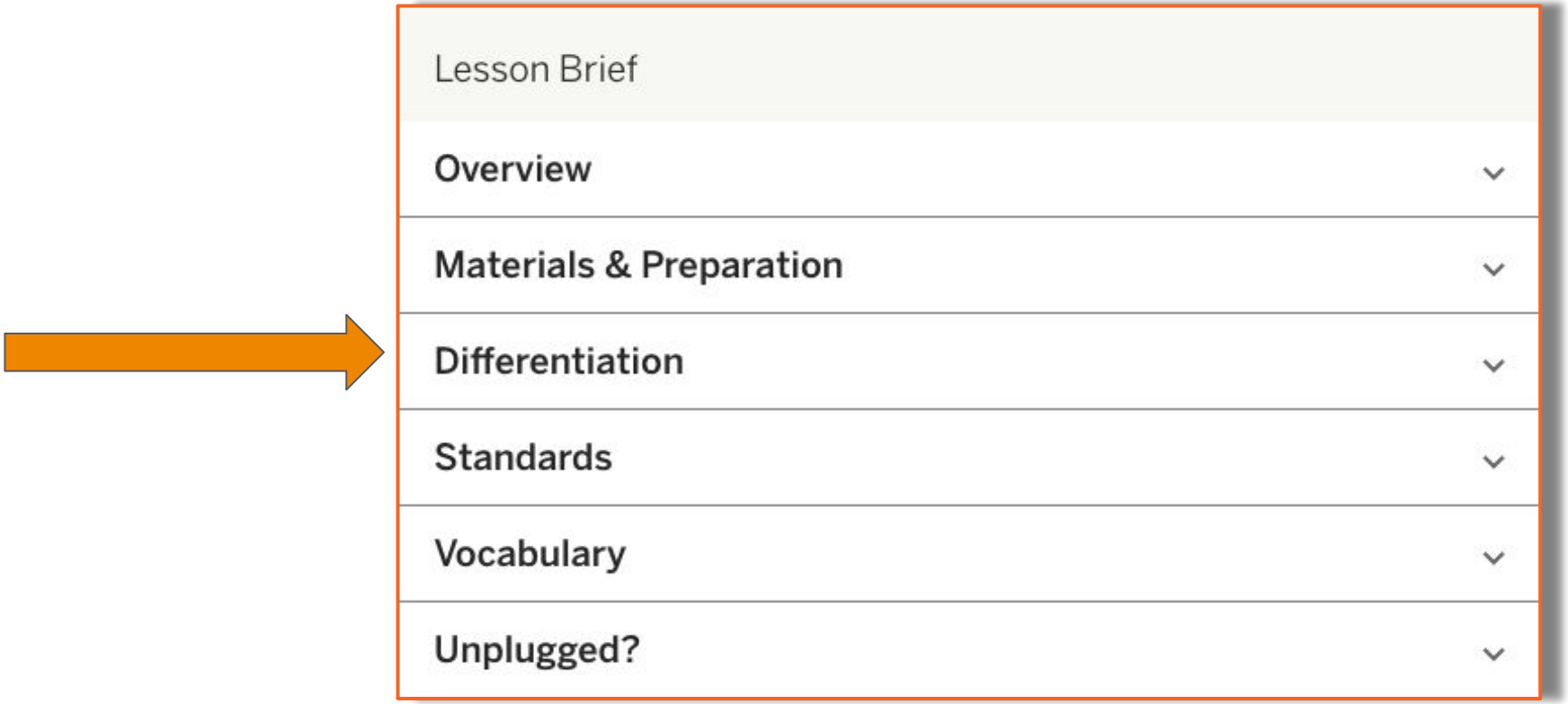
Differentiation in Amplify Science



Differentiation briefs

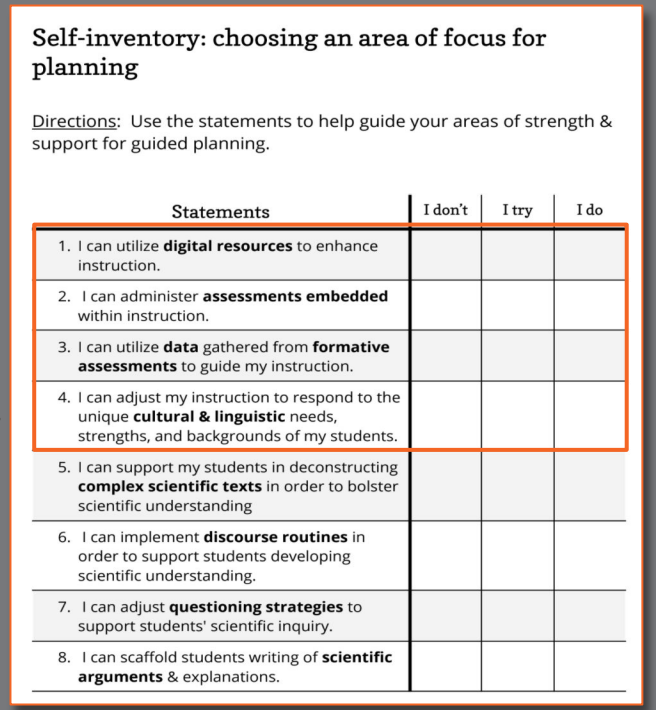
Categories of differentiation briefs

- Embedded supports for diverse learners
- Potential challenges in this lesson
- Specific differentiation strategies for English learners
- Specific differentiation strategies for students who need more support
- Specific differentiation strategies for students who need more challenge

Model activity

As you observe activity, focus on your successes, challenges, & next steps from this area of the self-inventory

1,2,3,4



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19 Lessons

Rock Transformations

Why are rock samples from the Great Plains and from the Rocky mountains composed of such similar minerals, when they look so different and come from different areas?

Taking on the role of student geologists, students investigate a geologic puzzle: two rock samples, one from the Great Plains and one from the Rocky Mountains, look very different but are composed of a surprisingly similar mix of minerals. Did the rocks form together and somehow get split apart? Or did one rock form first, and then the other rock form from the materials of the first rock? To solve the mystery, students learn about how rock forms and transforms, driven by different energy sources.

Rock Transformations: Geologic Puzzle of the Rockies and Great Plains

Problem students work to solve

Why are rock samples from the Great Plains and from the Rocky Mountains composed of such similar minerals, when they look so different and come from different areas?

Chapter 1

How did the rock of the Great Plain

How do rocks form? (1.3-1.5)

This is what students did before the model activity...

Here's what students need to figure out...

Evidence sources and reflection opportunities

- Observe rock samples (1.2)
- Form rocks in the Sim (1.3)
- Use hard candy to model how rocks form from sediment (1.4)
- Watch a video about rocks forming from magma (1.4)
- Model how rocks form using the paper Modeling Tool (1.5)

Key concepts

- Rocks can form in different ways. This causes them to be different types. (1.4)
- When sediment is compacted and cemented together, it forms sedimentary rock. (1.4)
- When magma cools, it hardens to form igneous rock. (1.4)

Application of key concepts to problem

- Examine evidence about the rocks of the Great Plains and Rocky Mountains to determine whether they formed from sediment or magma (1.5)

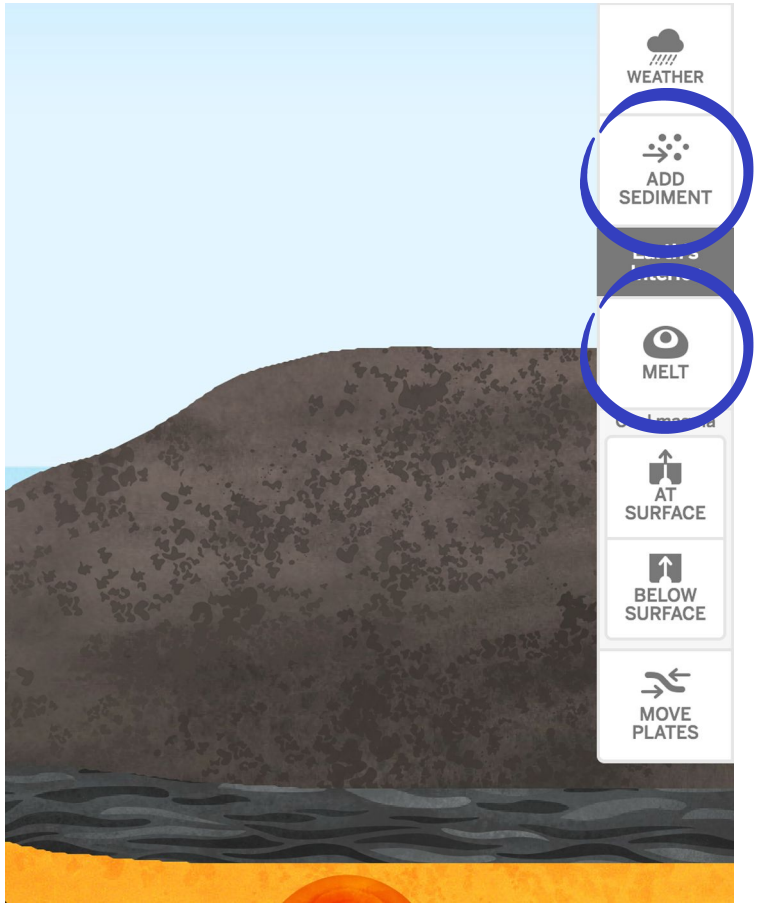
Explanation that students can make to answer the Chapter 1 Question

The rock of the Great Plains is sedimentary rock and the rock of the Rocky Mountains is igneous rock. They formed in different ways so they must not have formed together. Rocks can form in different ways. This causes them to be different types. When sediment is compacted and cemented together, it forms sedimentary rock. When magma cools, it hardens to form igneous rock.

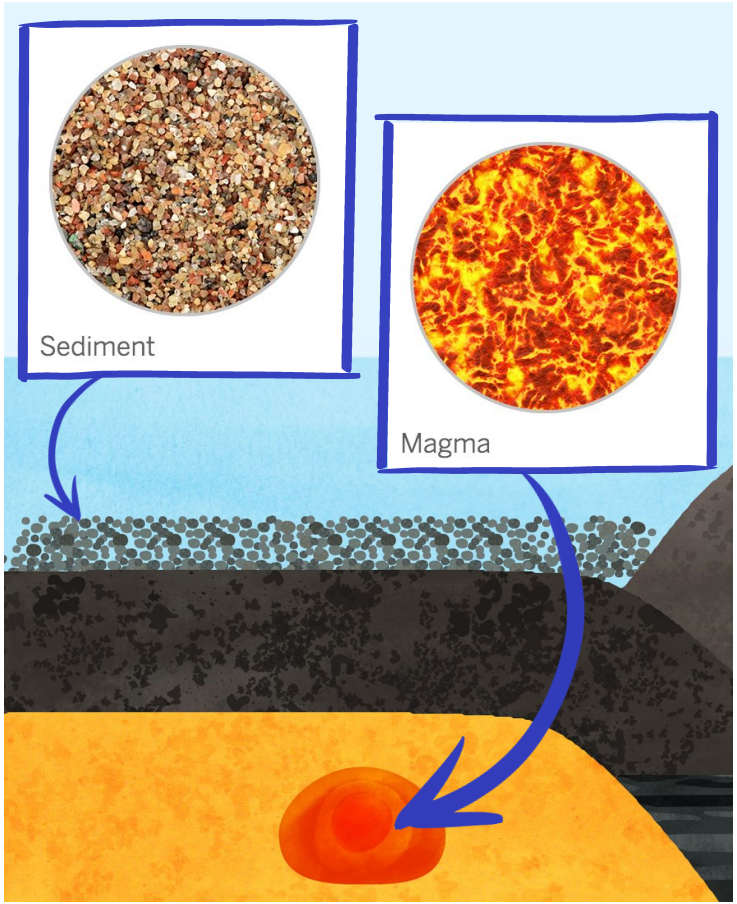
10 MIN

Activity 3

Considering How Rocks Form



In the Sim, two of the processes you used to form rocks were **ADD SEDIMENT** and **MELT** (in order to cool magma).



What did you learn about **magma** and **sediment** in the Sim?

Vocabulary

magma

hot liquid rock below the surface of Earth

Vocabulary

sediment

small pieces of rock

Next, you'll answer some questions to **reflect on what you have learned** in this lesson.

Your reflections should always show your best, independent thinking.

Considering How Rocks Form

Reflecting on How Rocks Form

Think about what you saw in the *Rock Transformations* Simulation. Then, answer the questions below.

What happened to the sediment?

- It turned into rock inside other rock.
- It turned into a layer of rock.
- It turned into a volcano.

Today, we investigated this question using the Sim:

Investigation Question:
How do rocks form?

Activity 4

Family Homework Experience

For this activity, you will explore **rocks you find around your home** with a family member.

Family Homework Experience (Optional)

Family Homework Experience: Exploring Rocks at Home

Work with a member of your household to examine rocks that you find near your house or elsewhere. Find two rocks that look different from each other. Discuss each rock with your family member and work together to describe what it looks and feels like. Then, think about how each rock you chose might have been formed. Explain to the member of your household how you think it might have been formed and describe what evidence you are using to decide how each rock might have been formed. Use the chart below to put down a few notes about your conversation.

- You may work with more than one member of your household.
- You might need to explain a little about how rocks are formed in order for the member of your household to be able to work with you.

End of Lesson

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UNIVERSITY OF CALIFORNIA, BERKELEY

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Reflect & discuss

How does this model activity demonstrate & offer opportunities to

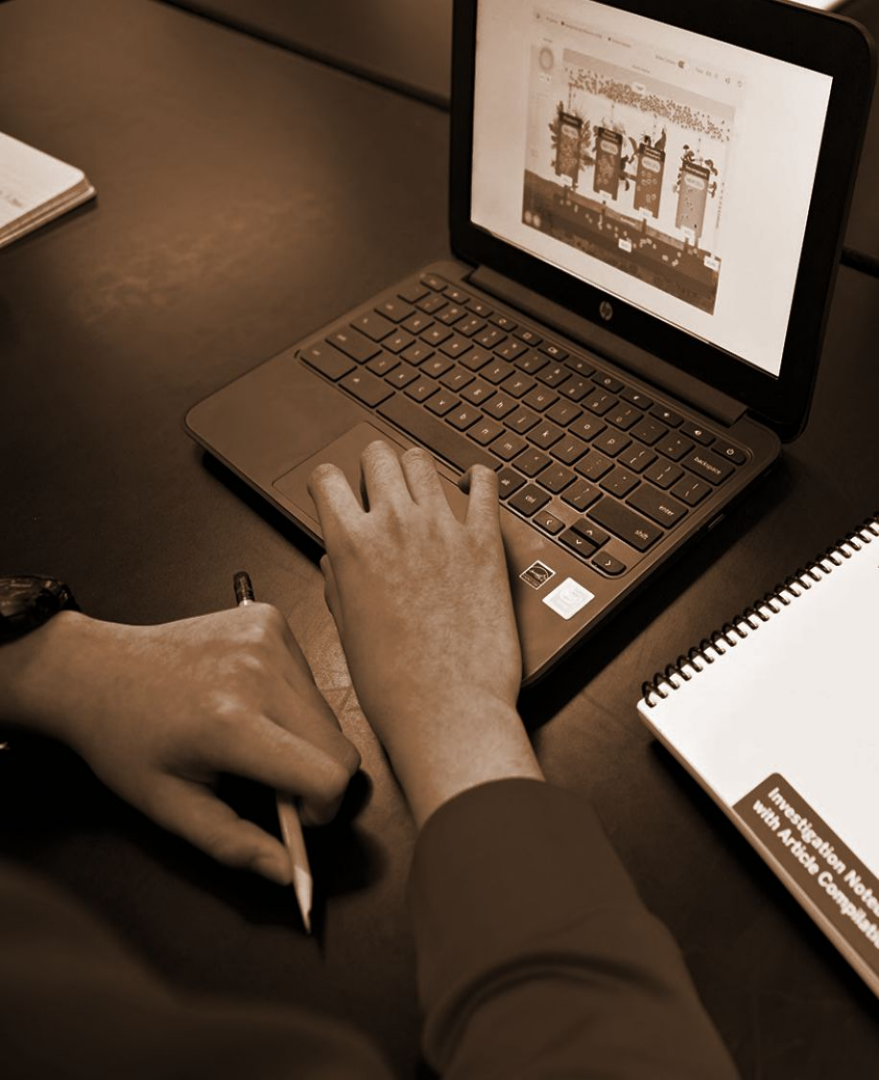
- Utilize digital resources to enhance instruction?
- Administer assessments embedded within instruction?
- Utilize data gathered from formative assessments to guide instruction?
- Adjust instruction to respond to the unique cultural & linguistic needs, strengths, and backgrounds of students?

Collaborative reflection: reaching diverse learners

On the slides, enter:

- Successes
- Tools & strategies you found helpful
- Challenges
- Your next steps in this area

Questions?



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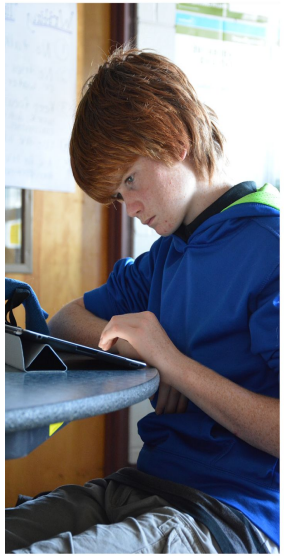
Science & Literacy

Guiding Principles for Disciplinary Literacy in Amplify Science

1. Students can acquire literacy expertise through the pursuit of science knowledge and by engaging in scientific and engineering practices.
2. Attention to disciplinary literacy instruction should begin as soon as students enter school and should continue throughout the grades.
3. Participation in a community is key to acquiring disciplinary expertise and literacy.
4. Argumentation and explanation are the central enterprises of science and, thus, these practices are the focus of reading, writing, and speaking in science.



Accessing complex texts

A typical Active Reading sequence

First Read	Second Read	Third Read
Independent, followed by paired and whole class discussion	Reading for a teacher-directed purpose, followed by a paired, complementary activity	Diving into the text for other, content-related purposes

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

Support for reading complex text

During various reading experiences

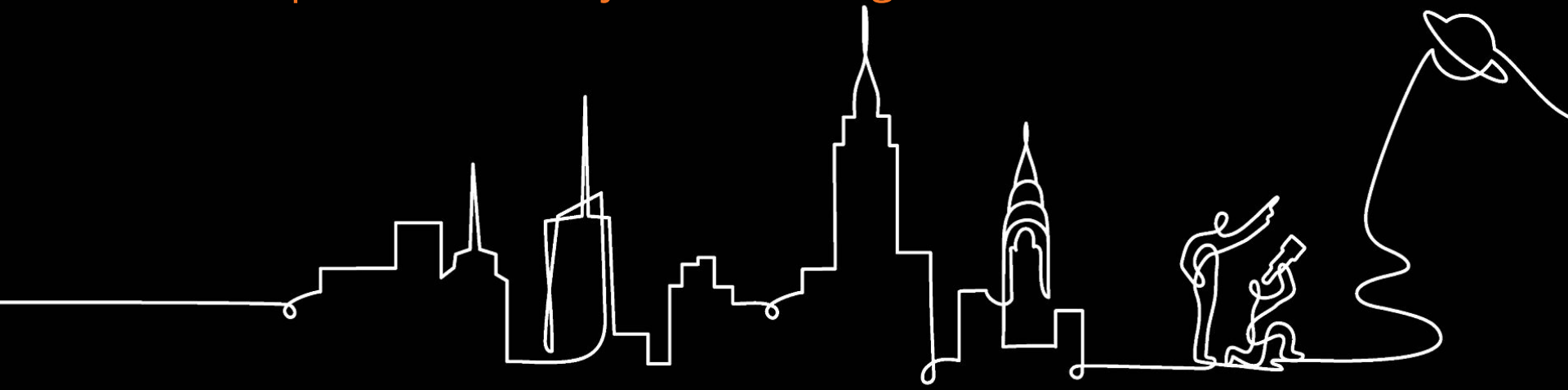
- Variety of reading experiences:
  - Short articles, homework, evidence cards, student notebook / digital platform
- Students are expected to continue using the basic components of Active Reading during these alternate reading experiences;
  - encouraged to annotate and are
  - often provided with guiding questions

Questions?

Supporting academic discourse

Speaking and Listening in Amplify Science

Amplify provides many authentic opportunities, both informal & formal/structured, for speaking and listening as students refine their thinking and communicate their ideas to various audiences. Throughout the Amplify curriculum, students use discussion to construct explanations and join in oral argumentation.



Speaking and Listening in Amplify

- There are many informal opportunities for students to engage with one another as almost every activity in Amplify is meant to be conducted with a partner or small group.
- The primary formal opportunity for student discourse is the Science Seminar for student discourse. Two others are:

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

Science Seminar: Remote/Hybrid

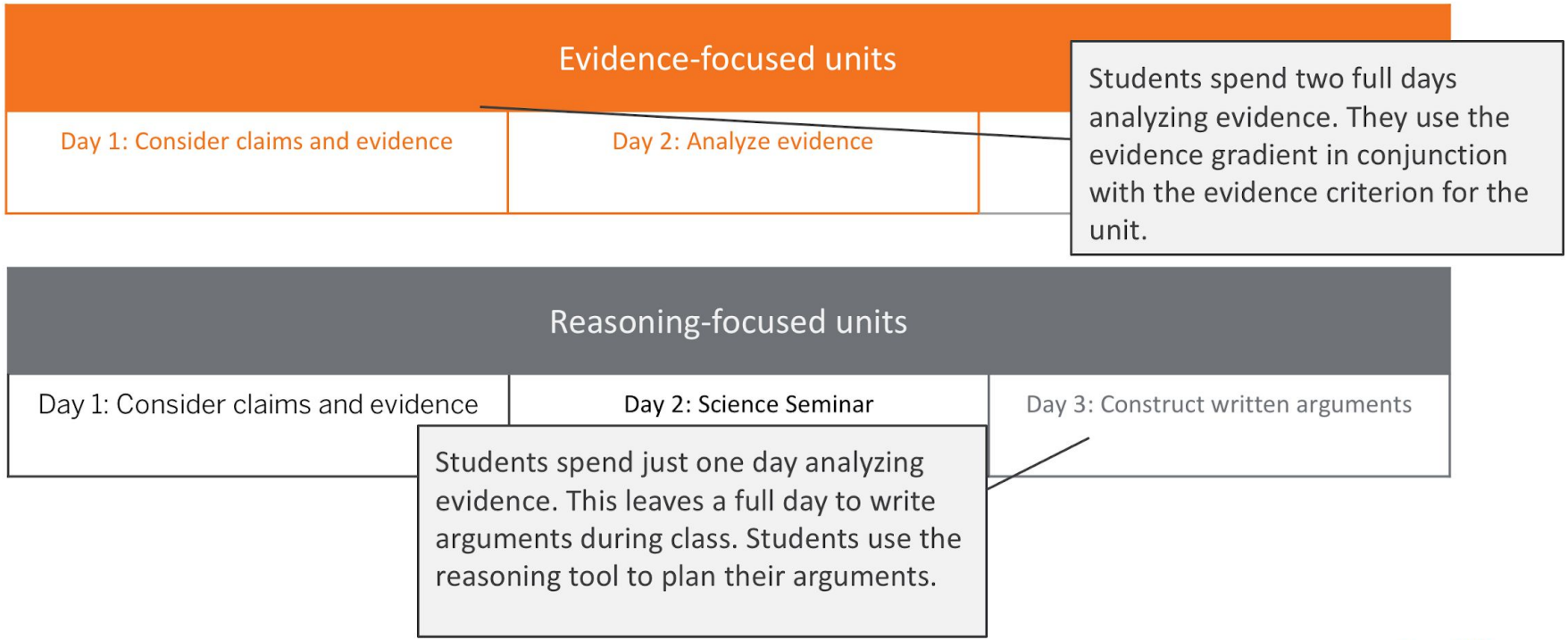
Considering claims and evidence

Participating in the Science Seminar

Writing an argument

Science Seminar sequence:

Evaluating evidence focus vs. reasoning focus



What is academic discourse?

Academic language

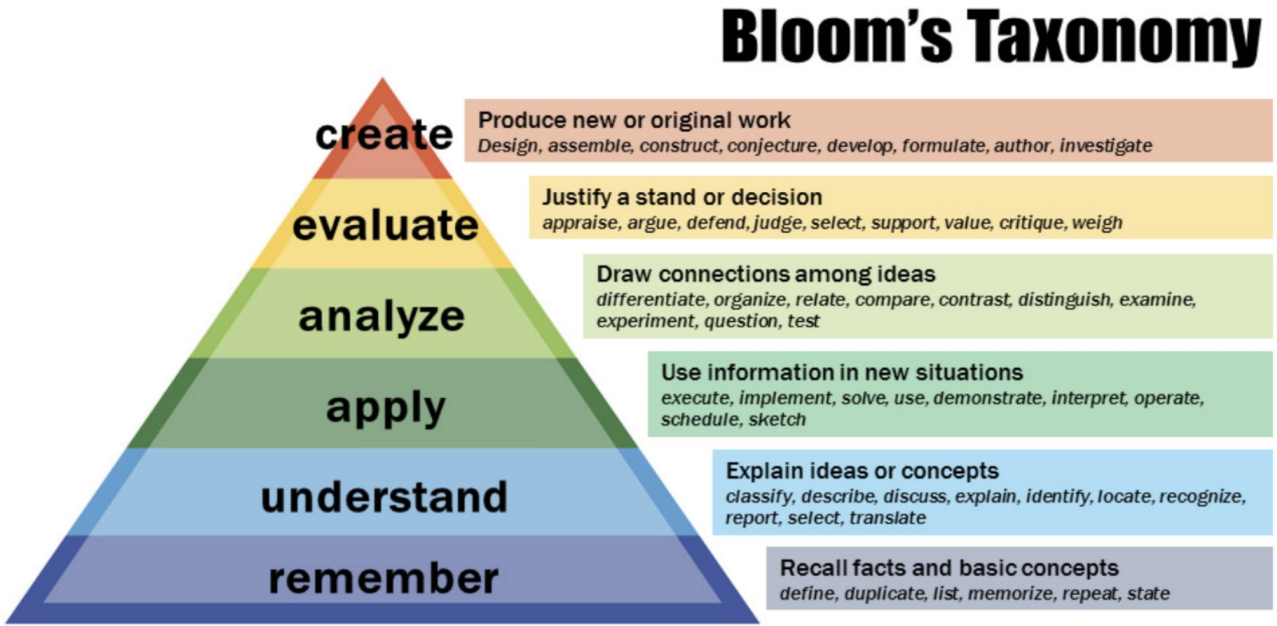
Academic discourse

- Identify…
- What is…?
- List…
- Students use tier 1 and 2 vocabulary

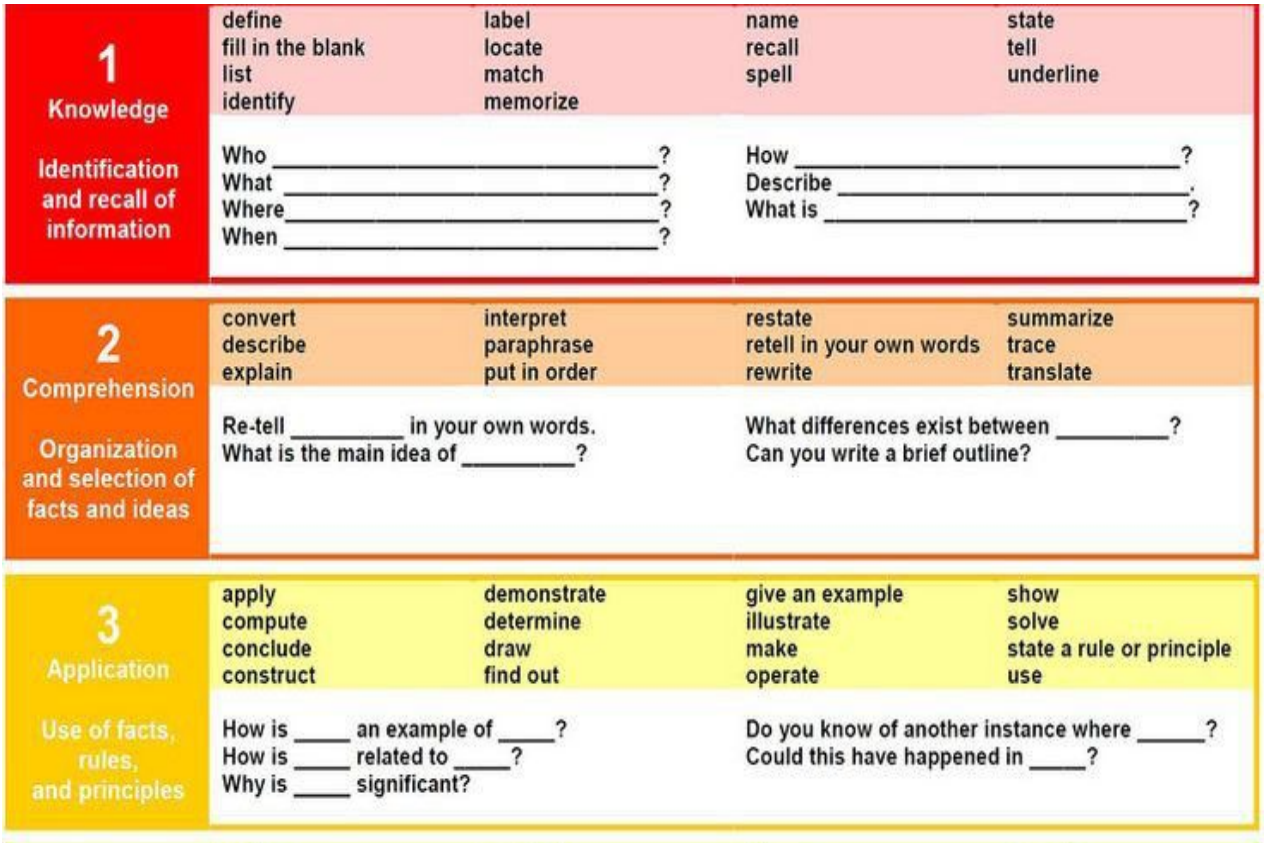
- Prove/disprove with evidence…
- What would happen if….how do you know?
- Explain how this connects to…
- Students use tier 2 & 3 vocabulary

How can strategic teacher questions throughout the lesson promote a higher level of student academic discourse?

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.



Bloom's Taxonomy



1 Knowledge Identification and recall of information	define fill in the blank list identify	label locate match memorize	name recall spell	state tell underline
	Who _____? What _____? Where _____? When _____?		How _____? Describe _____. What is _____?	
2 Comprehension Organization and selection of facts and ideas	convert describe explain	interpret paraphrase put in order	restate retell in your own words rewrite	summarize trace translate
	Re-tell _____ in your own words. What is the main idea of _____?		What differences exist between _____? Can you write a brief outline?	
3 Application Use of facts, rules, and principles	apply compute conclude construct	demonstrate determine draw find out	give an example illustrate make operate	show solve state a rule or principle use
	How is _____ an example of _____? How is _____ related to _____? Why is _____ significant?		Do you know of another instance where _____? Could this have happened in _____?	

From https://www.teachthought.com/learning-models/25-question-stems-framed-around-blooms-taxonomy

Bloom's Taxonomy

4 Analysis Separating a whole into component parts	analyze categorize classify compare	contrast debate deduct determine the factors	diagram differentiate dissect distinguish	examine infer specify
	What are the parts or features of _____? Classify _____ according to _____. Outline/diagram/web/map _____.		How does ____ compare/contrast with ___? What evidence can you present for _____?	
5 Synthesis Combining ideas to form a new whole	change combine compose construct create design	find an unusual way formulate generate invent originate plan	predict pretend produce rearrange reconstruct reorganize	revise suggest suppose visualize write
	What would you predict/infer from _____? What ideas can you add to _____? How would you create/design a new _____?		What solutions would you suggest for ____? What might happen if you combined _____ with _____?	
6 Evaluation Developing opinions, judgements, or decisions	appraise choose compare conclude	decide defend evaluate give your opinion	judge justify prioritize rank	rate select support value
	Do you agree that _____? Explain. What do you think about _____? What is most important?		Prioritize _____ according to _____? How would you decide about _____? What criteria would you use to assess ____?	

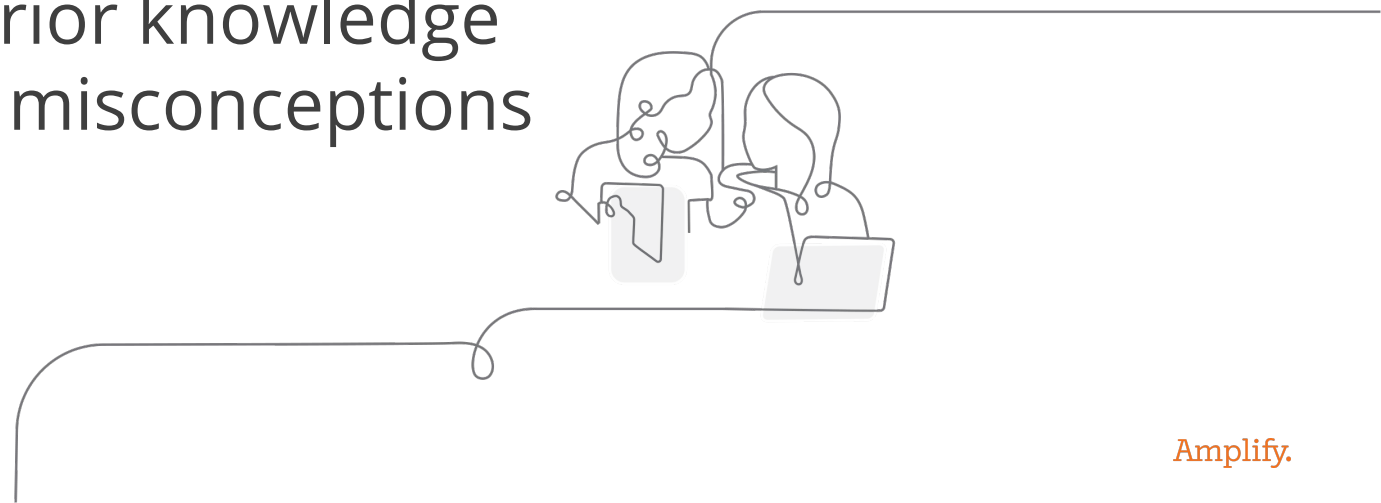
From https://www.teachthought.com/learning-models/25-question-stems-framed-around-blooms-taxonomy/

To make connections within a unit of study, ask students to:

- **Remember:** What are we figuring out in this unit? What do you already know?
- **Understand:** Describe how this lesson activity is connected to the unit/chapter/investigation question?
- **Apply:** Use the unit vocabulary to enhance your scientific explanation.
- **Analyze:** What information can you use from the Simulation to support your explanation or argument? Describe how the ideas / concepts fit together?
- **Evaluate:** Defend your claim with at least two sources of evidence. Critique the argument of a peer and provide feedback on their supporting evidence.
- **Create:** Design a model to support the solution.

Questioning in Amplify Science

- clarify understanding
- justify claims
- verify evidence
- accessing prior knowledge
- uncovering misconceptions

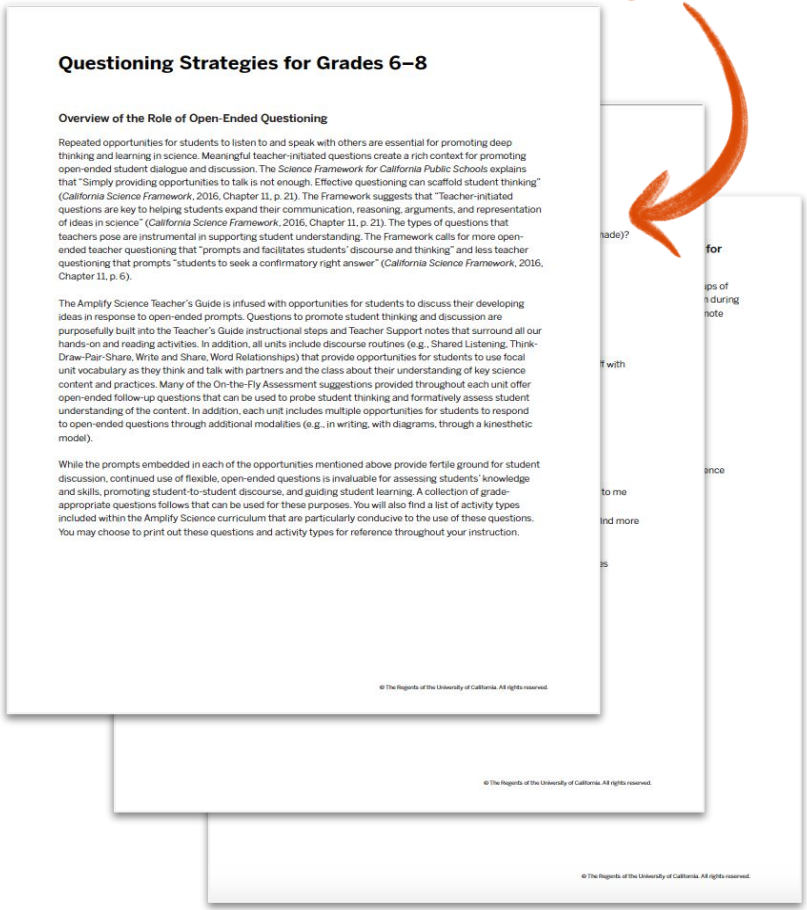


Questioning Strategies

Open-Ended Questions to Facilitate Student Thinking & Discourse

- Questions to assess students' knowledge and skills
- Questions to promote student-to-student discourse
- Questions to guide student learning

Pages 2-4



Questioning Strategies for Grades 6–8

Overview of the Role of Open-Ended Questioning

Repeated opportunities for students to listen to and speak with others are essential for promoting deep thinking and learning in science. Meaningful teacher-initiated questions create a rich context for promoting open-ended student dialogue and discussion. The *Science Framework for California Public Schools* explains that "Simply providing opportunities to talk is not enough. Effective questioning can scaffold student thinking" (*California Science Framework*, 2016, Chapter 11, p. 21). The Framework suggests that "Teacher-initiated questions are key to helping students expand their communication, reasoning, arguments, and representation of ideas in science" (*California Science Framework*, 2016, Chapter 11, p. 21). The types of questions that teachers pose are instrumental in supporting student understanding. The Framework calls for more open-ended teacher questioning that "prompts and facilitates students' discourse and thinking" and less teacher questioning that prompts "students to seek a confirmatory right answer" (*California Science Framework*, 2016, Chapter 11, p. 6).

The Amplify Science Teacher's Guide is infused with opportunities for students to discuss their developing ideas in response to open-ended prompts. Questions to promote student thinking and discussion are purposefully built into the Teacher's Guide instructional steps and Teacher Support notes that surround all our hands-on and reading activities. In addition, all units include discourse routines (e.g., Shared Listening, Think-Draw-Pair-Share, Write and Share, Word Relationships) that provide opportunities for students to use focal unit vocabulary as they think and talk with partners and the class about their understanding of key science content and practices. Many of the On-the-Fly Assessment suggestions provided throughout each unit offer open-ended follow-up questions that can be used to probe student thinking and formatively assess student understanding of the content. In addition, each unit includes multiple opportunities for students to respond to open-ended questions through additional modalities (e.g., in writing, with diagrams, through a kinesthetic model).

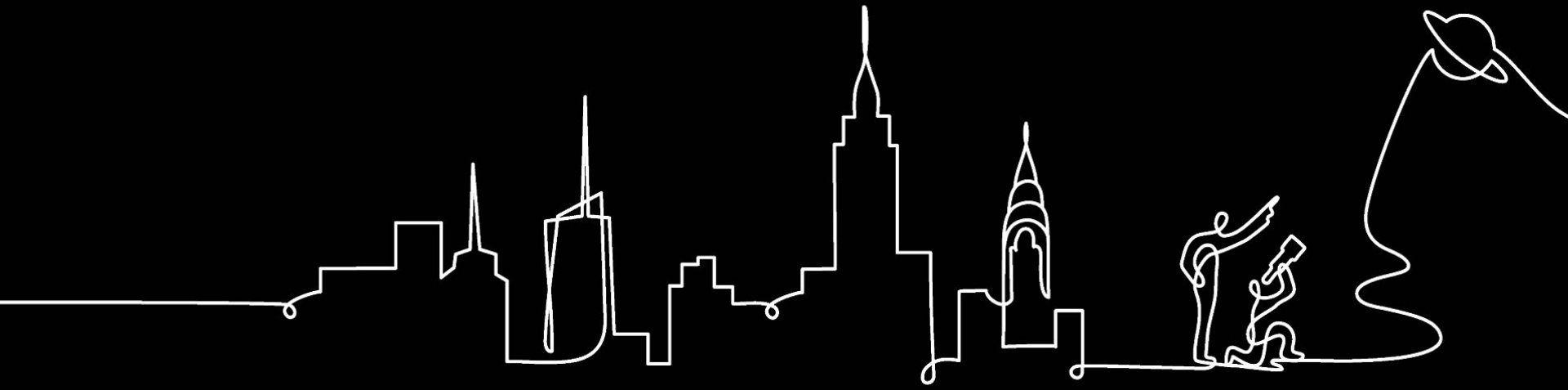
While the prompts embedded in each of the opportunities mentioned above provide fertile ground for student discussion, continued use of flexible, open-ended questions is invaluable for assessing students' knowledge and skills, promoting student-to-student discourse, and guiding student learning. A collection of grade-appropriate questions follows that can be used for these purposes. You will also find a list of activity types included within the Amplify Science curriculum that are particularly conducive to the use of these questions. You may choose to print out these questions and activity types for reference throughout your instruction.

Questions?

Writing in Science

Writing in Amplify Science

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

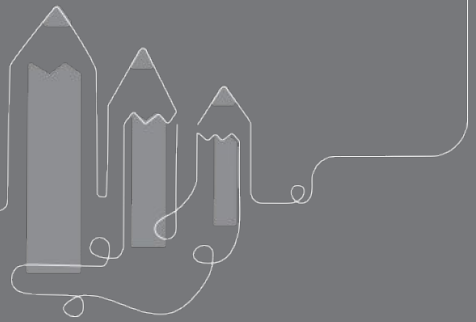


Why do students write in Amplify Science?

- To activate background knowledge
- To reflect on understanding
- To communicate
  - To explain
  - To persuade
- To record data / observations
- To have a record of your own thinking

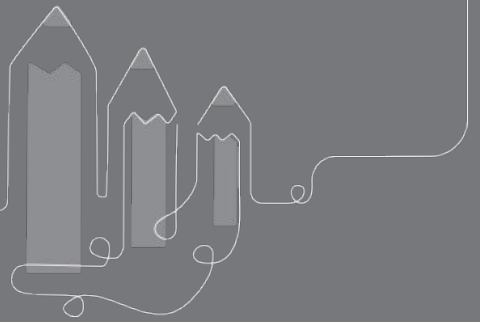
“Small writes” prompt students to **synthesize** new understandings with existing conceptual knowledge.

Examples: daily warm-ups & evidence card annotations



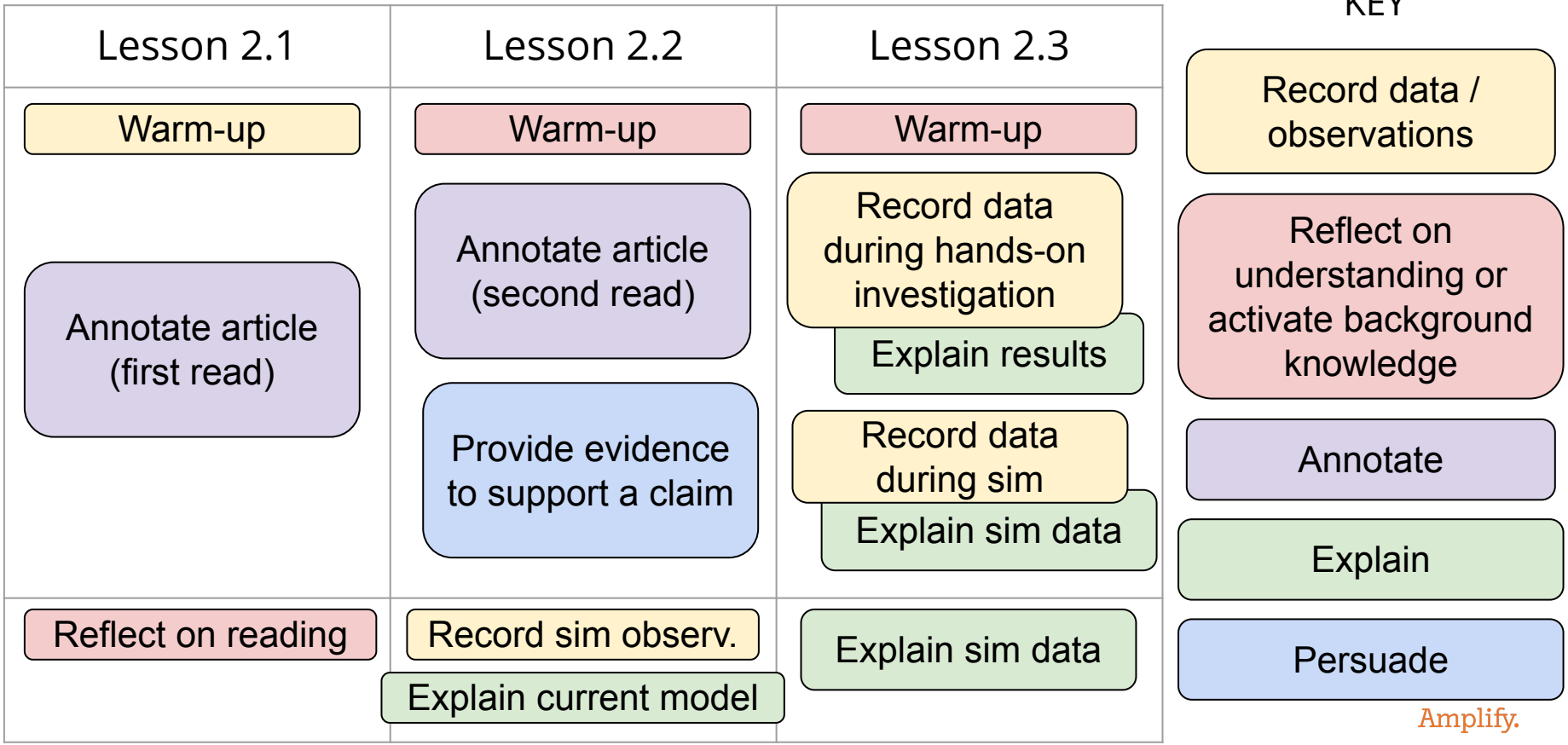
As they gather evidence, students engage in writing and discussion. They make sense of evidence they gather through these through small writes.

Writing is a **key part of the multimodal approach** as students figure out a phenomenon.



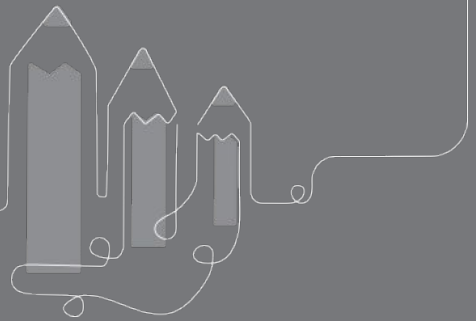
Example

Writing across a chapter: different purposes for writing in *Oceans, Atmosphere and Climate* Chapter 2

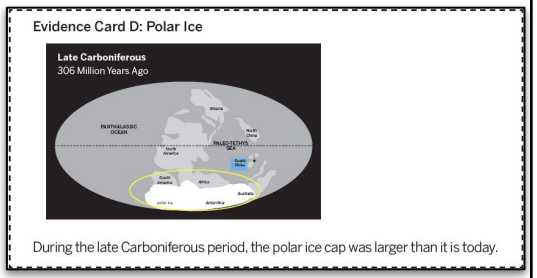


The “big write” : Science Seminar final written argument

Students’ argumentation writing is scaffolded in many significant ways. For example, for units where Reasoning is a focus, the Reasoning Tool was conceived of as a scaffold for supporting students in thinking about and identifying the reasoning that would be needed to make a convincing argument.

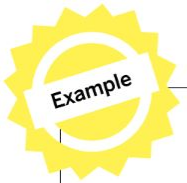


Reasoning Tool

Evidence	This matters because . . . (How does this evidence support the claim?)	Therefore, . . . (claim)
Evidence card D  	The current that flowed from the South pole past South China would have gotten really cold. It would have been colder than the air and the air would have transferred a lot of energy and cooled down.	South China was cooler than it is today.

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	

Scientific Argument Sentence Starters

An additional scaffold

Describing evidence:	**Describing how evidence supports a claim:**
The evidence that supports my claim is… My first piece of evidence is… Another piece of evidence shows that…	If _____, then… This change caused… The effect of this change was… This is important because… Since… Based on the evidence, I conclude that… This claim is stronger because…

Using the Reasoning Tool to Write an Argument

State your claim.

I support Claim ___ , which states that South China during the late Carboniferous was . . .

Describe the evidence.

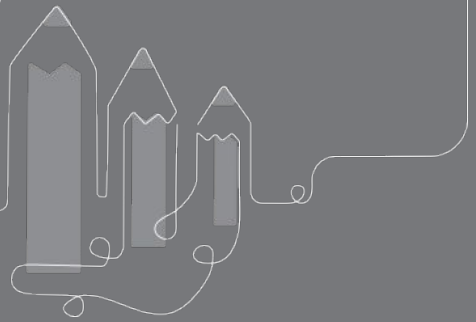
In the late Carboniferous, South China . . . (Evidence Card ___). Another evidence card shows . . .

Explain how the evidence supports the claim.

Together, this evidence shows . . .

Some of the most challenging aspects of scientific argumentation are providing **sufficient high quality evidence** and using **reasoning** to make clear the connections between pieces of evidence and the claim.

The science seminar sequence provides **scaffolds** for these challenges.



Rubrics for Assessing Students' Final Written Arguments

Three-dimensional

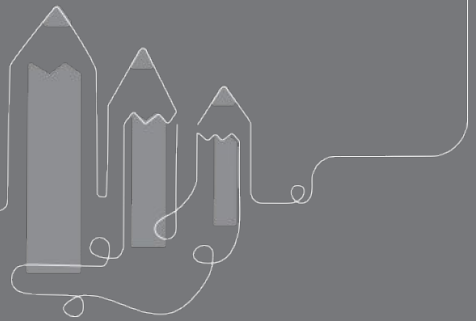
- Rubric 1: Assessing Students' Understanding of Science Concepts (DCIs) — summative
- Rubric 2: Assessing Students' Understanding of the Crosscutting Concept of Cause and Effect — summative
- Rubric 3: Assessing Students' Performance of the Practice of Constructing Scientific Arguments — formative

Rubric 3: Assessing Students' Performance of the Practice of Constructing Scientific Arguments

- Formative rubric
- Provides suggestions for feedback
- Possible responses supporting each claim

Criteria for a strong written argument
Takes a stance
Explanatory
Justified by the reasoned use of evidence
Employs high-quality information
Clear and well-organized

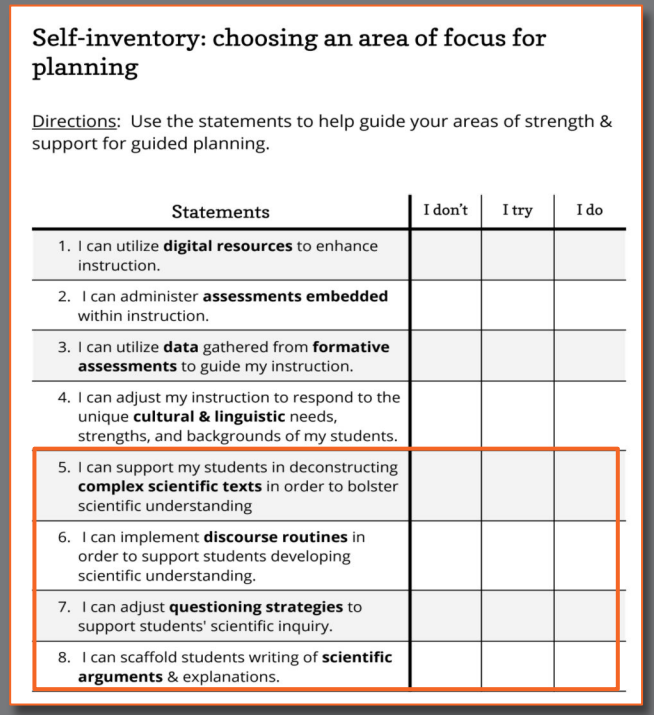
The Rubrics for Assessing Students' Final Written Arguments provide guidance you can use as you review and provide feedback on students' writing **throughout the unit.**



Model activity

As you observe activity, focus on your successes, challenges, & next steps from this area of the self-inventory

5,6,7,8



Self-inventory: choosing an area of focus for planning

Directions: Use the statements to help guide your areas of strength & support for guided planning.

Statements	I don't	I try	I do
1. I can utilize **digital resources** to enhance instruction.			
2. I can administer **assessments embedded** within instruction.			
3. I can utilize **data** gathered from **formative assessments** to guide my instruction.			
4. I can adjust my instruction to respond to the unique **cultural & linguistic** needs, strengths, and backgrounds of my students.			
5. I can support my students in deconstructing **complex scientific texts** in order to bolster scientific understanding			
6. I can implement **discourse routines** in order to support students developing scientific understanding.			
7. I can adjust **questioning strategies** to support students' scientific inquiry.			
8. I can scaffold students writing of **scientific arguments** & explanations.			

Rock Transformations: Geologic Puzzle of the Rockies and Great Plains

Problem students work to solve

Why are rock samples from the Great Plains and from the Rocky Mountains composed of such similar minerals, when they look so different and come from different areas?

Chapter 1 Question

How did the rock of the Great Plains and Rocky Mountains form?

Investigation Question

How do rocks form? (1.3-1.5)

Evidence sources and reflection opportunities

- Observe rock samples (1.2)
- Form rocks in the Sim (1.3)
- Use hard candy to model how rocks form from sediment (1.4)
- Watch a video about rocks forming from magma (1.4)
- Model how rocks form using the paper Modeling Tool (1.5)

Key concepts

different ways. This causes them to (1.4)
compacted and cemented together, ry rock. (1.4)
s, it hardens to form igneous rock.

Here's what students have figured out so far...

Here's what students need to do next...

Application of key concepts to problem

- Examine evidence about the rocks of the Great Plains and Rocky Mountains to determine whether they formed from sediment or magma (1.5)

Explanation that students can make to answer the Chapter 1 Question

The rock of the Great Plains is sedimentary rock and the rock of the Rocky Mountains is igneous rock. They formed in different ways so they must not have formed together. Rocks can form in different ways. This causes them to be different types. When sediment is compacted and cemented together, it forms sedimentary rock. When magma cools, it hardens to form igneous rock.

Activity 3

Evaluating Rock Observations

Chapter 1 Question

How did the rock of the Great Plains and Rocky Mountains form?

Evaluating Rock Observations

To: Student Geologists
From: Dr. Jackie Lewis, Professor of Geology
Subject: Observations of Great Plains and Rocky Mountains

Bascom University

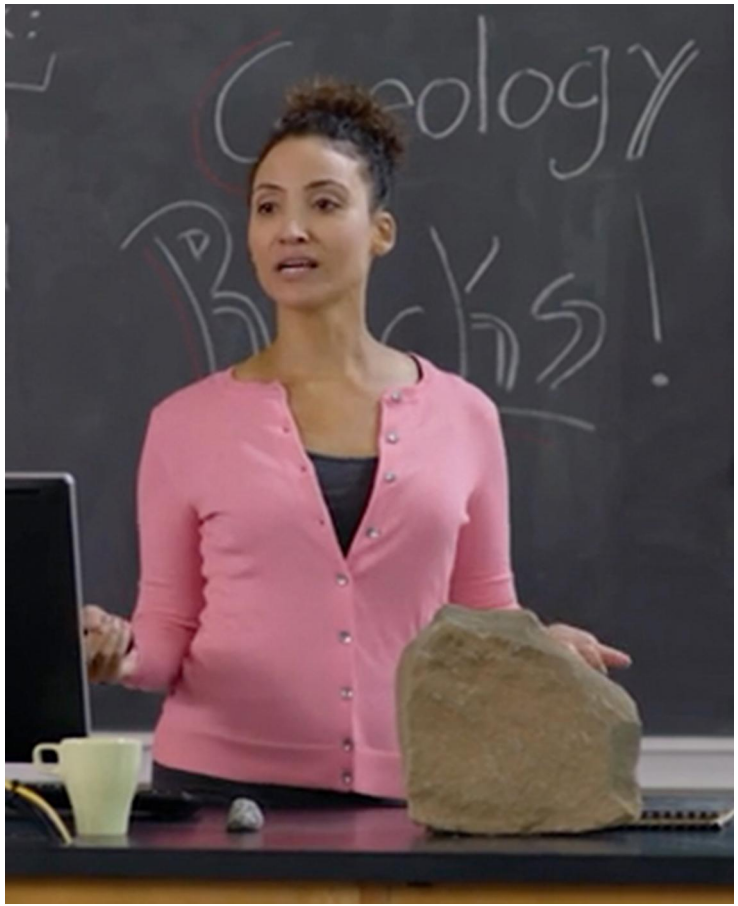
We are continuing our investigation of how the rock formations in the Great Plains and Rocky Mountains formed.

I'm sending you some observations of both regions. These were collected by student geologists in the field. They made observations of both the rock samples and the landscape.

I'd like you to sort through these observations and decide which are worth keeping and which are not detailed enough (and, therefore, do not provide strong enough evidence). We look forward to your response!

These **evidence cards** show observations that were made by student geologists in the field.

Dr. Lewis has asked us to look them over.



Dr. Lewis wants us to determine which observations provide strong evidence.

Why is it important to use the **best evidence** possible?

Evidence Criterion

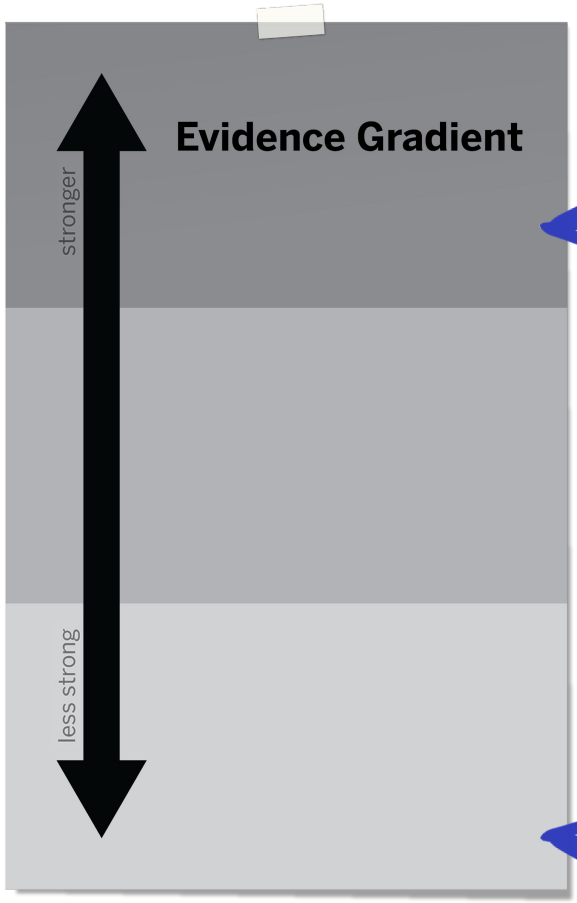
More detailed observations provide stronger evidence.

We are focusing on this **Evidence Criterion.**

However, in this class and beyond there are other factors to consider when evaluating evidence.

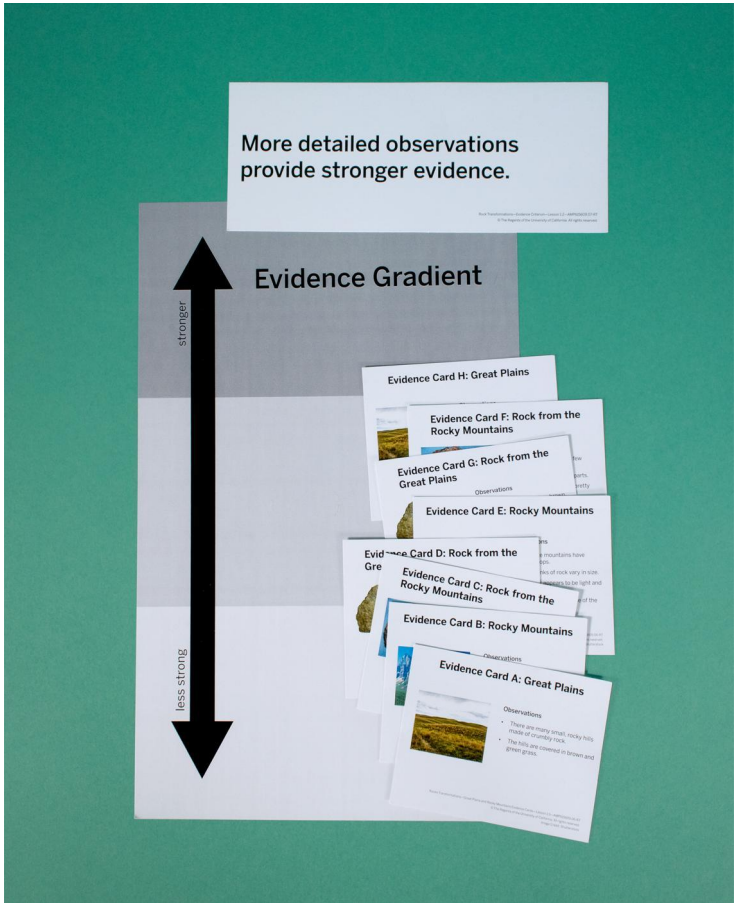
Geologist's Detailed Observation Guidelines

1. Observe the **number and colors of grains** in the rock.
2. Observe the **sizes and shapes** of grains.
3. Observe whether the grains look **stuck together** or fitted together like puzzle pieces.
4. Observe the rock's **texture**, including how hard it is.
5. Notice whether there are **unusual features** in the rock, such as bubbles or fossils.

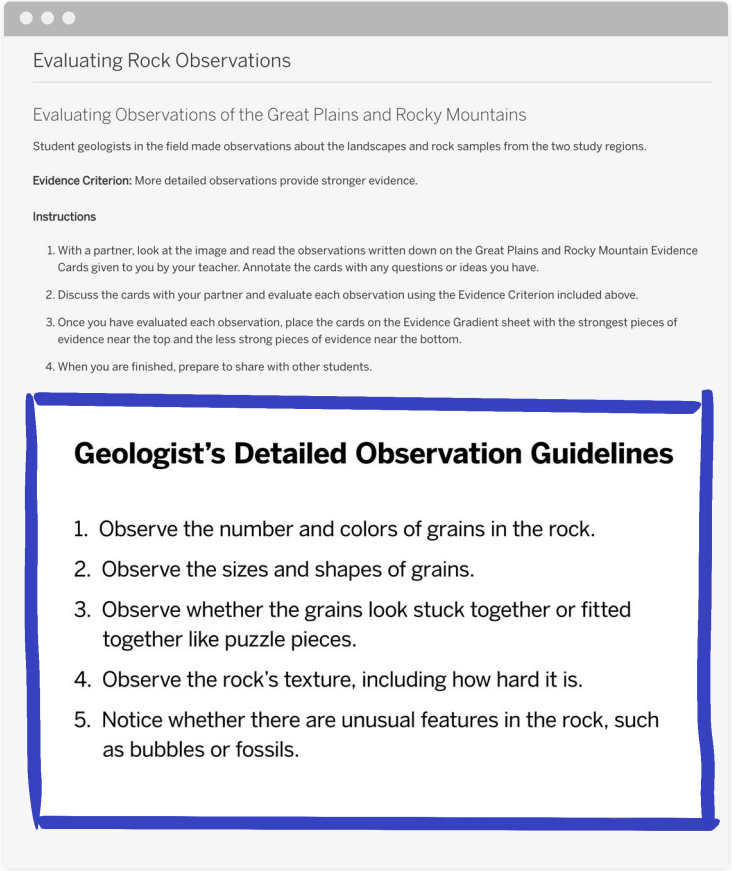


The **Evidence Gradient** is a tool for evaluating evidence.

The **most detailed** observations go on top. Observations that are **less detailed** go lower.



You'll work with a partner to discuss the cards and decide where to **place each card on the gradient**, depending on how strong and detailed the observation on that card is.



Evaluating Rock Observations

Evaluating Observations of the Great Plains and Rocky Mountains

Student geologists in the field made observations about the landscapes and rock samples from the two study regions.

Evidence Criterion: More detailed observations provide stronger evidence.

Instructions

1. With a partner, look at the image and read the observations written down on the Great Plains and Rocky Mountain 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 above.
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, prepare to share with other students.

Geologist's Detailed Observation Guidelines

1. Observe the number and colors of grains in the rock.
2. Observe the sizes and shapes of grains.
3. Observe whether the grains look stuck together or fitted together like puzzle pieces.
4. Observe the rock's texture, including how hard it is.
5. Notice whether there are unusual features in the rock, such as bubbles or fossils.

These **guidelines** can help you decide if an observation is detailed.

There is no right answer, so you may disagree. Try to come to an agreement before placing each card.

Evaluating Rock Observations

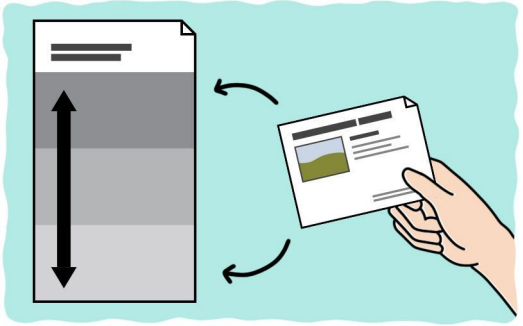
Read and Annotate

Look at the image and read the observations written on each card.

Annotate the cards with any questions or ideas you have.

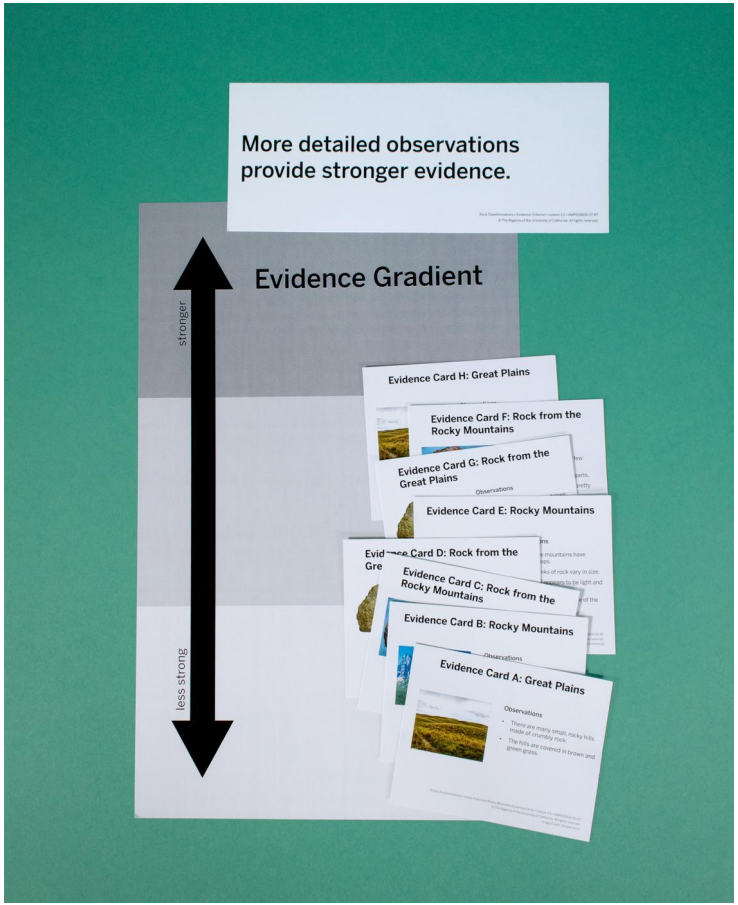
Discuss

Discuss the cards with your partner, and evaluate each observation using the Evidence Criterion.



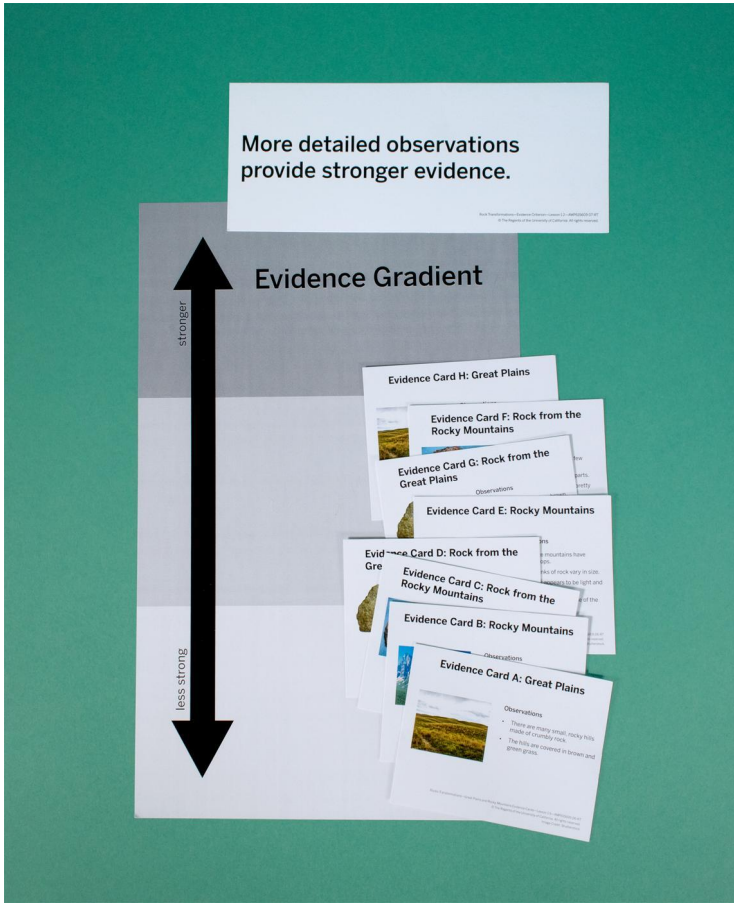
Place Cards

Place each card on the Evidence Gradient with the strongest pieces of evidence near the top and the less strong pieces of evidence near the bottom.



Which evidence cards were the **easiest** to place on the gradient?

Which ones were the **most difficult?**



Now let's come to an agreement as a class.

Which evidence cards do you think will be **most useful?**

8 MIN

Activity 4

Discussing How the Rocks Formed

Next, you and your partner will use **evidence** to determine how the Great Plains and Rocky Mountains formed.

Rock Characteristics Chart

Sedimentary	Igneous
Observations: • Can have many different colors • Grains are rounded and can be different sizes: tiny like sand or big like pebbles • Can be crumbly • Can appear layered • Can have fossils **How the rock was made:** • Made when sediment was compacted and cemented	**Observations:** • Can have many different colors • Grains have sharp edges that fit together like puzzle pieces • Can be very hard • Can have bubbles **How the rock was made:** • Made when magma cooled

You'll compare the evidence cards to the characteristics of **sedimentary and igneous rocks** to determine what types of rocks are found in the two locations.

Discussing How the Rocks Formed

Thinking Back to the Rockies and Plains

Answer the questions below with your partner. Use the observations you determined were most detailed from the evidence cards and the Rock Characteristics chart to help you.

Rock Characteristics Chart

Sedimentary	Igneous

How did the rock of the Great Plains and Rocky Mountains form?

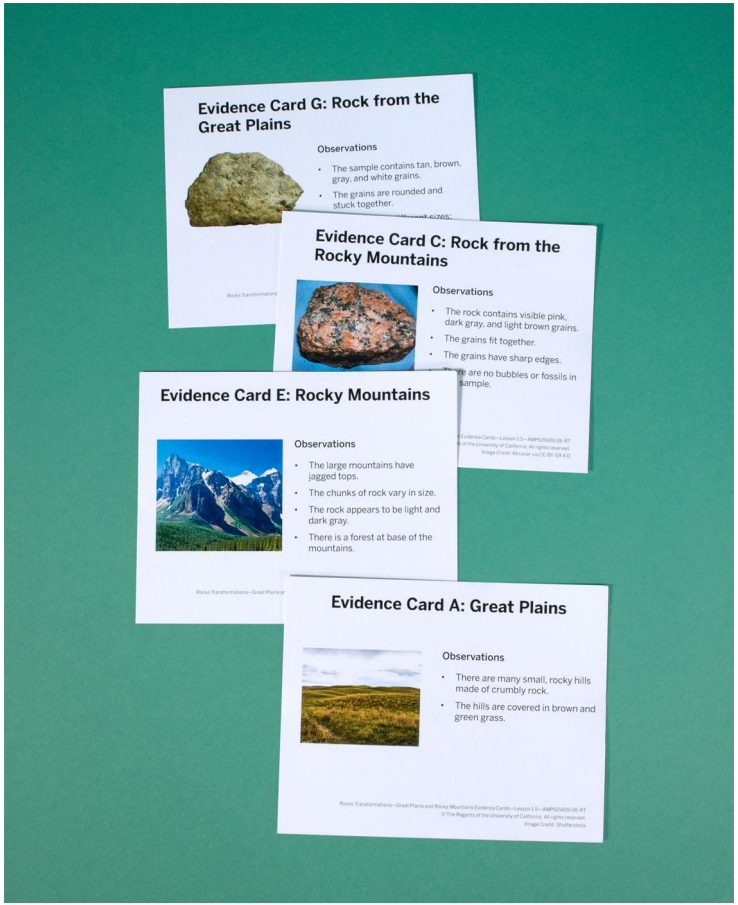
Claim 1: They formed as one rock formation, and then something separated them.

Claim 2: One rock formation formed before the other. Then, the minerals from the older rock became part of the younger rock.

Based on what we've figured out, let's discuss our claims and see if we can eliminate one.

Activity 5

Homework



For this activity, you will use our evidence to **write an explanation** of how the rock in the Great Plains and Rocky Mountains formed and why Claim 1 can be eliminated.

Homework

Revisiting the Claims

Use the evidence cards to answer the questions below.

Evidence Card A: Great Plains

Observations

- There are many small, rocky hills made of crumbly rock.
- The hills are covered in brown and green grass.

Evidence Card E: Rocky Mountains

Observations

- The large mountains have jagged tops.
- The chunks of rock vary in size.
- The rock appears to be light and dark gray.
- There is a forest at base of the mountains.

Reflect & discuss

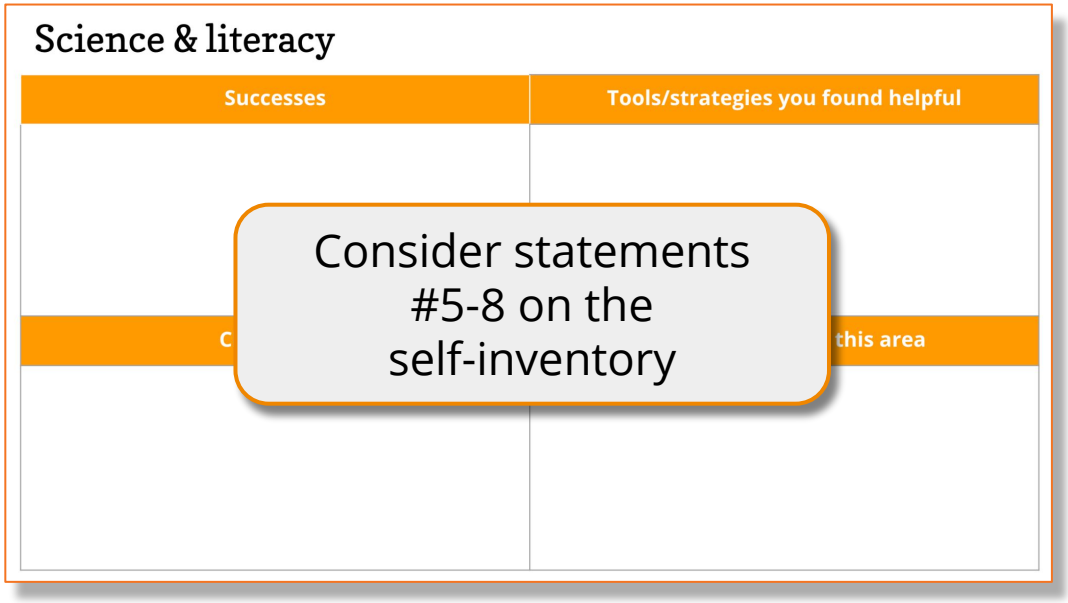
How does this model activity demonstrate & offer opportunities to

- Support students in deconstructing complex scientific texts in order to bolster scientific understanding?
- Implement discourse routines in order to support students developing scientific understanding?
- Adjust questioning strategies to support students' scientific inquiry?
- Scaffold students' writing of scientific arguments & explanations?

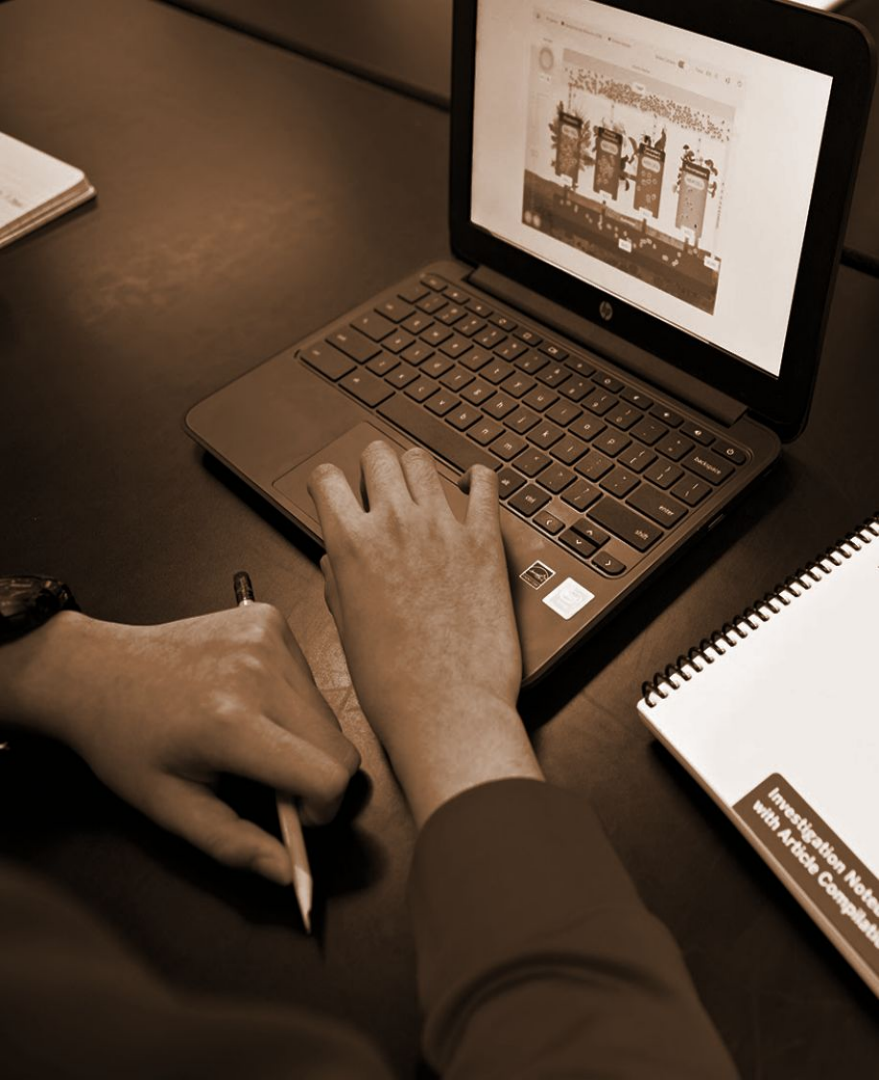
Collaborative reflection: science & literacy

On the slides, enter:

- Successes
- Tools & strategies you found helpful
- Challenges
- Your next steps in this area



Questions?



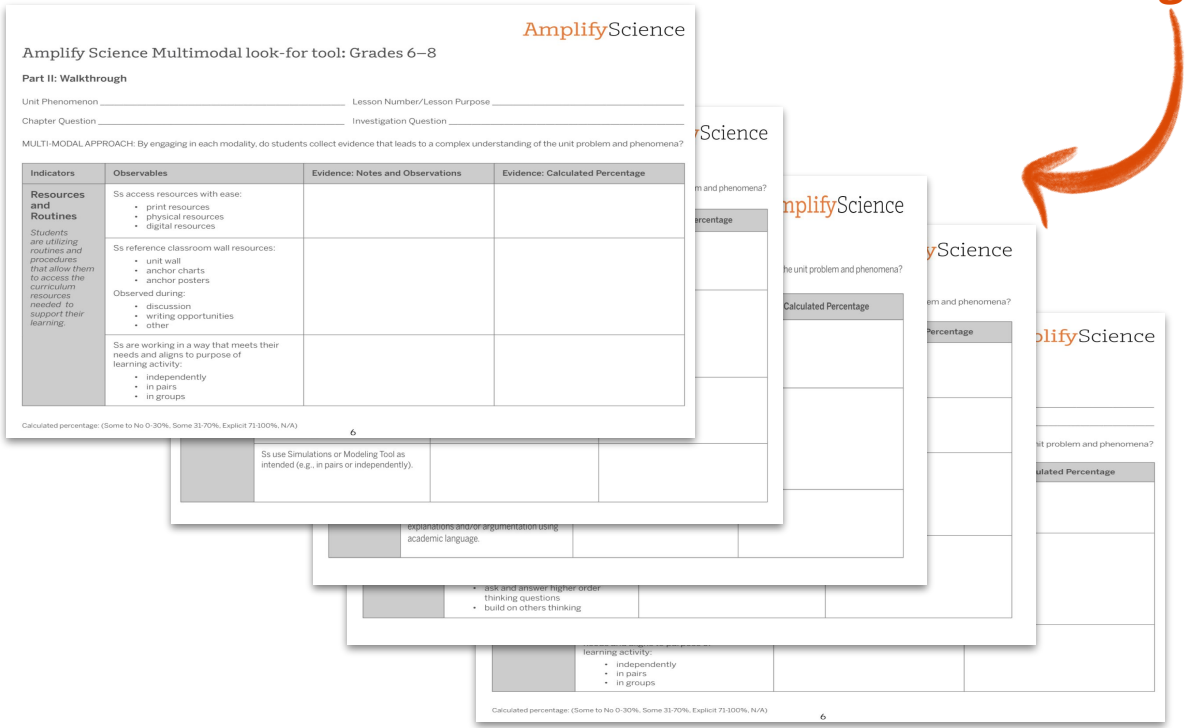
Plan for the day

- Framing the day
  - Welcome and introductions
  - Anticipatory activity
- Targeted Implementation Reflection
  - Digitally-enhanced learning
    - Remote/Hybrid Resources Utilization
  - Reaching diverse learners
    - Utilizing Embedded Assessments
    - Culturally Linguistically Responsive Teaching
  - Science & Literacy
    - Accessing Complex Texts
    - Supporting Academic Discourse
    - Writing In Science
- **Guided Planning**
  - **Amplify Science Multimodal Look-For Tool**
    - **Collaborative revisions**
- Closing
  - Reflection & additional resources
  - Survey

Amplify Science Multimodal Look-For Tool

Take a few moments to read individually…

Page 5


AmplifyScience

Amplify Science Multimodal look-for tool: Grades 6–8

Part II: Walkthrough

Unit Phenomenon _____ Lesson Number/Lesson Purpose _____

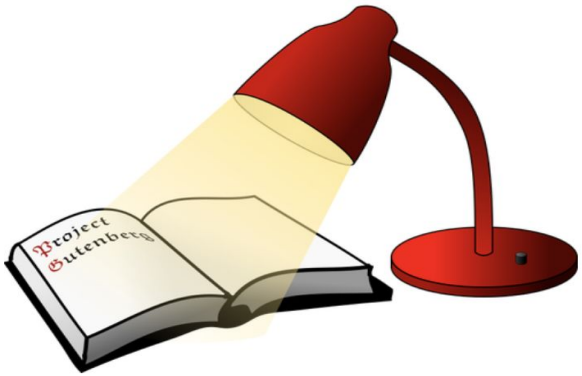
Chapter Question _____ Investigation Question _____

MULTI-MODAL APPROACH: By engaging in each modality, do students collect evidence that leads to a complex understanding of the unit problem and phenomena?

Indicators	Observables	Evidence: Notes and Observations	Evidence: Calculated Percentage
Resources and Routines *Students are utilizing routines and procedures that allow them to access the curriculum resources needed to support their learning.*	Ss access resources with ease: • print resources • physical resources • digital resources		
	Ss reference classroom wall resources: • unit wall • anchor charts • anchor posters Observed during: • discussion • writing opportunities • other		
	Ss are working in a way that meets their needs and aligns to purpose of learning activity: • independently • in pairs • in groups		

Calculated percentage: (Some to No 0-30%, Some 31-70%, Explicit 71-100%, N/A)

6



Collaborative revisions

Based on our targeted reflections, how would you revise this tool for next year?

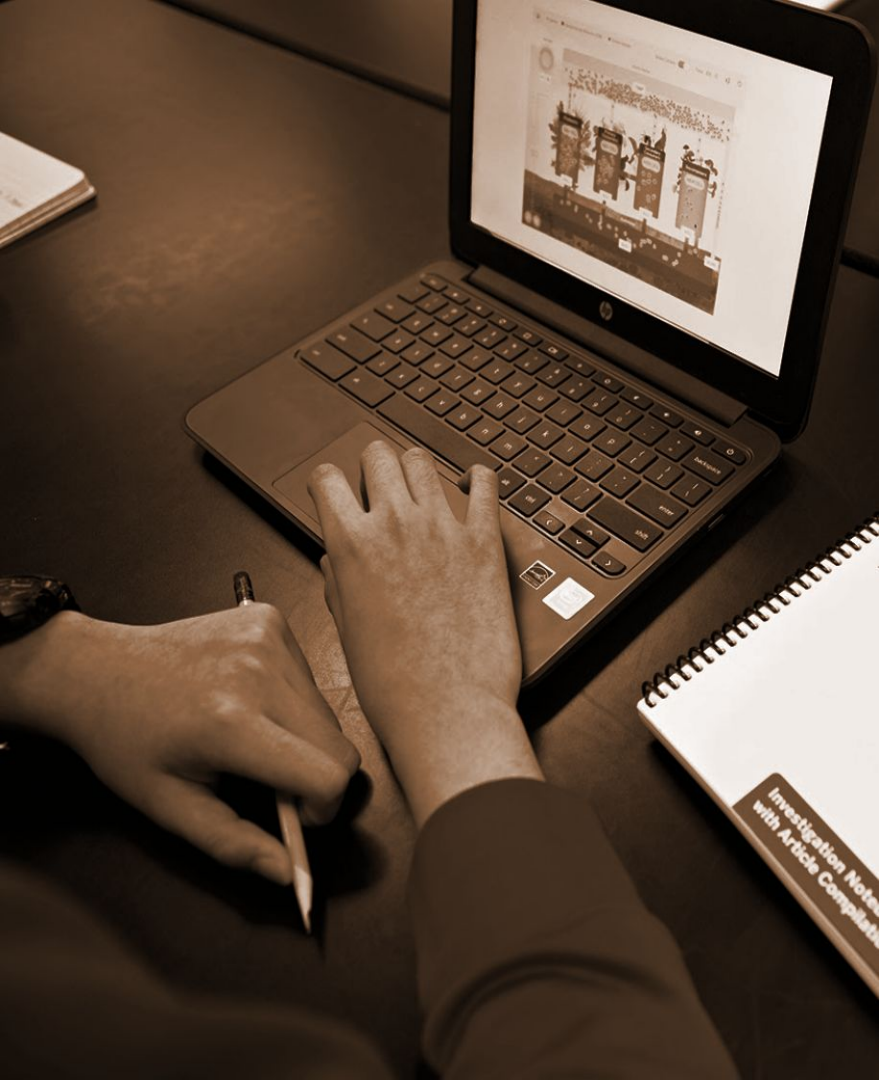
- ❏ Choose a **modality** from the **Look-For tool**
- ❏ On the **Jamboard** & in **breakout rooms**, add **sticky notes** for suggested **revisions**
- ❏ Choose a **spokesperson** to share findings

Debrief & reflection

- Share one **key-takeaway** from your breakout room planning work-time.

- Share one **new insight** you've gained from planning with regard to the **targeted areas** of **strength** and **support** you identified earlier for your **educators**.

Questions?



Plan for the day

- Framing the day
  - Welcome and introductions
  - Anticipatory activity
- Targeted Implementation Reflection
  - Digitally-enhanced learning
    - Remote/Hybrid Resources Utilization
  - Reaching diverse learners
    - Utilizing Embedded Assessments
    - Culturally Linguistically Responsive Teaching
  - Science & Literacy
    - Accessing Complex Texts
    - Supporting Academic Discourse
    - Writing In Science
- Guided Planning
- Amplify Science Multimodal Look-For Tool
  - Collaborative revisions
- **Closing**
  - **Reflection & additional resources**
  - **Survey**

3-2-1 Reflection

3	**Strategies to take away**

2	**Things I learned**

1	**Question I still have**

Revisiting our objectives

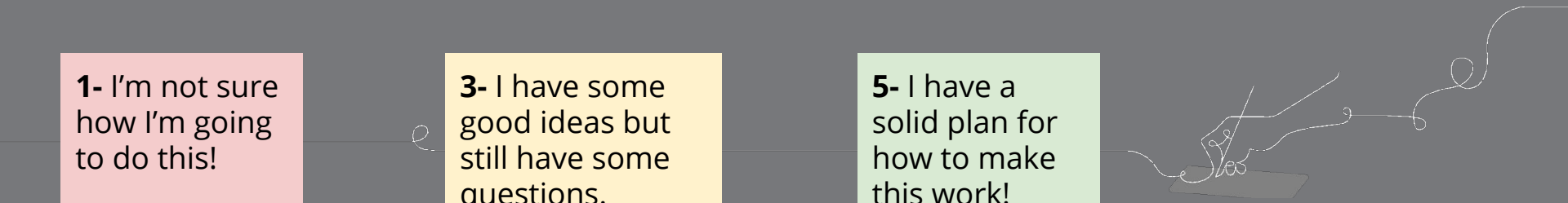
Do you feel ready to...

- Reflect on your borough's implementation of Amplify Science in the targeted areas of digitally-enhanced learning, supporting diverse learners, & disciplinary literacy?
- Utilize these reflections to begin focused revisions on the Amplify Science Multimodal Look-For tool?

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

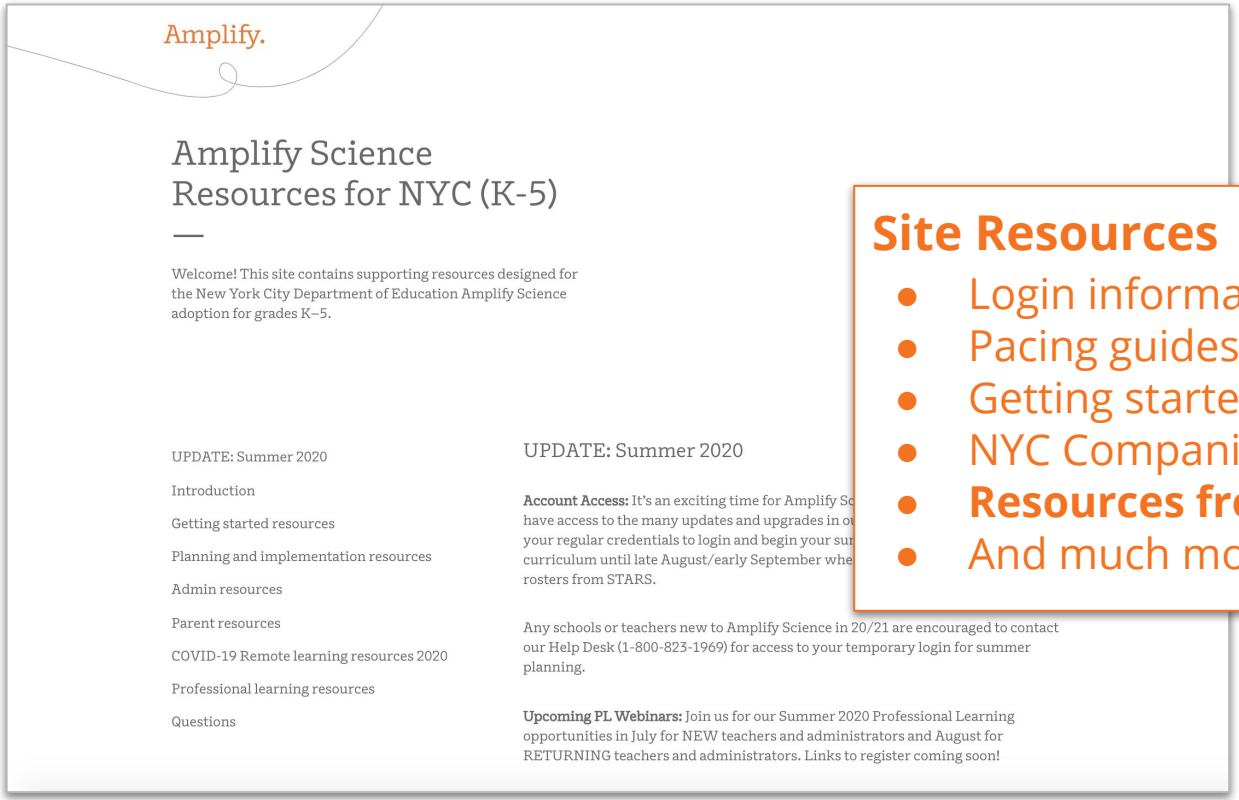
3- I have some good ideas but still have some questions.

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



New York City Resources Site

https://amplify.com/amplify-science-nyc-doe-resources/



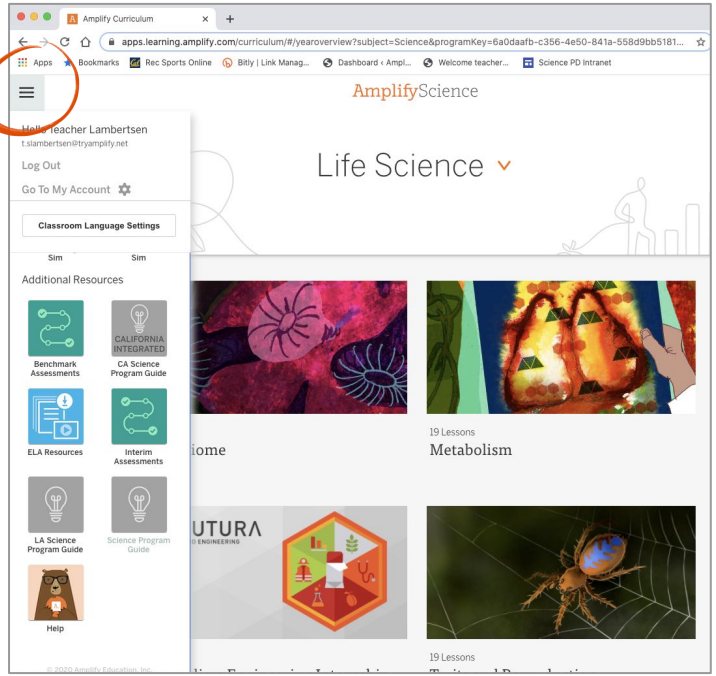
Site Resources

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

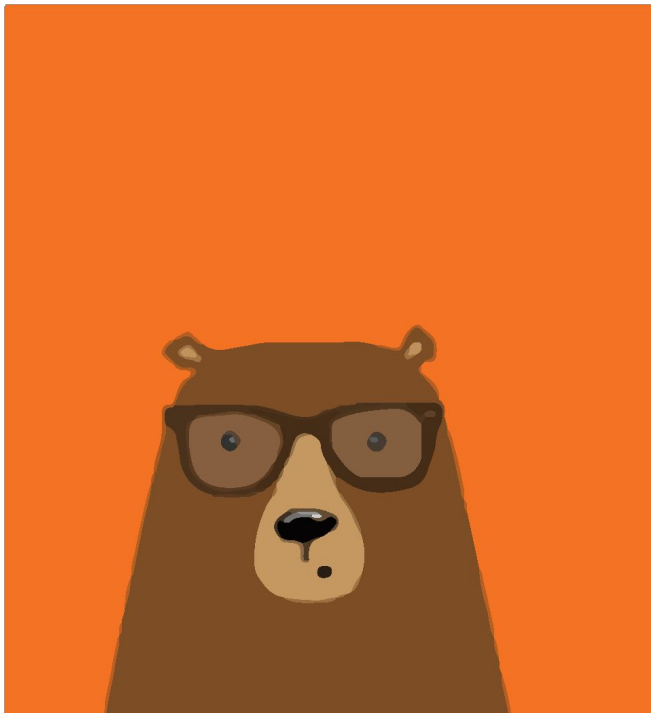
Amplify Science Program Hub

A hub for Amplify Science resources

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



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:

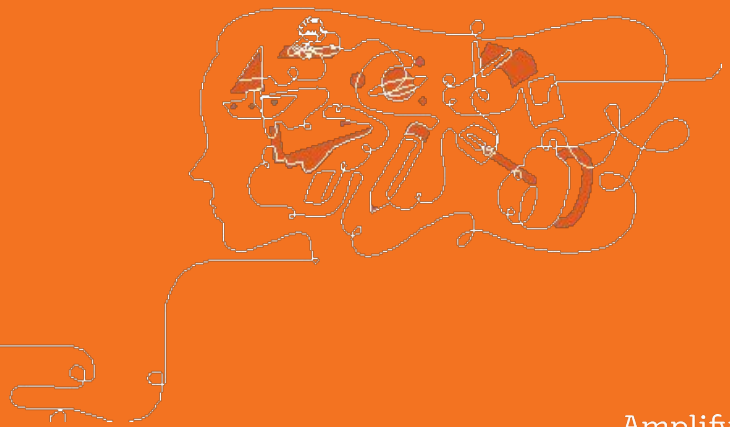
- Identify yourself as an Amplify Science user.
- Note the unit you are teaching.
- Note the type of device you are using (Chromebook, iPad, Windows, laptop).
- Note the web browser you are using (Chrome or Safari).
- Include a screenshot of the problem, if possible.
- Copy your district or site IT contact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


Final Questions?

Please provide us feedback!

URL: https://www.surveymonkey.com/r/BY56SBR

Presenter name:



Amplify.

Thank you & be well!