

Amplify Science

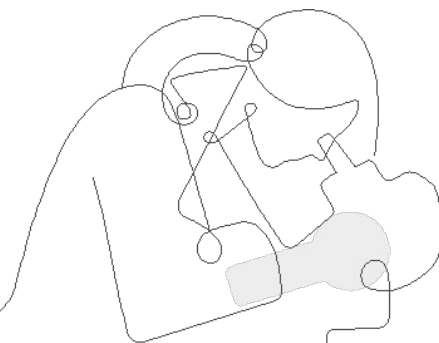
Unit 3: Earth's Features (with an assessment focus)

Grade 4, Part 1

School/District Name: LAUSD

Date:

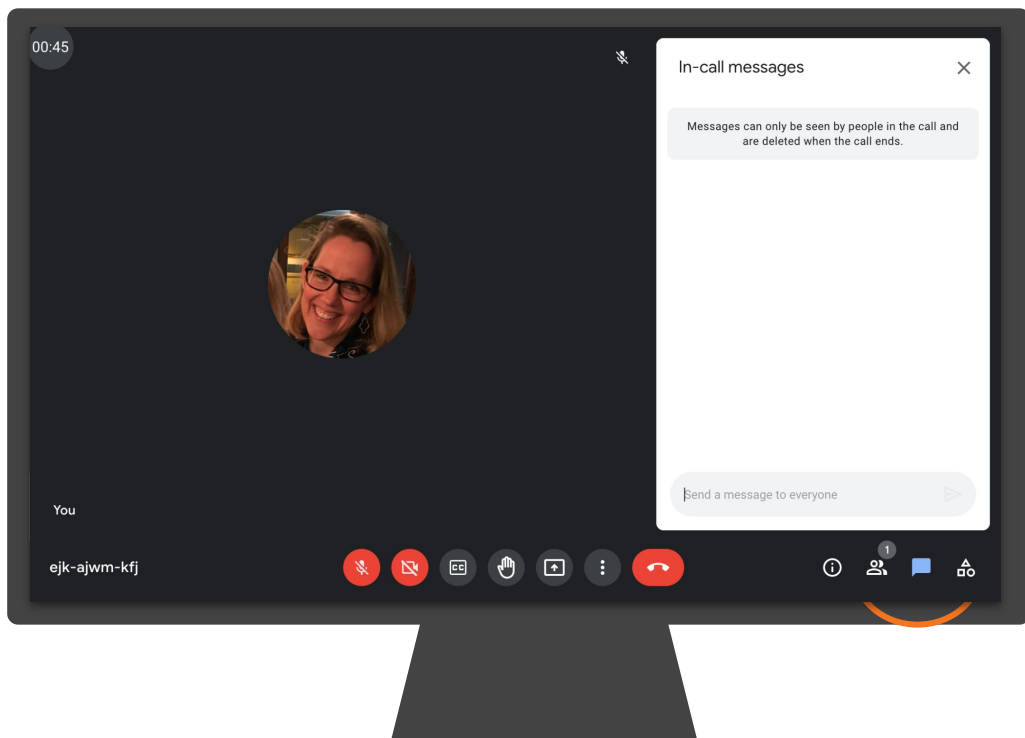
Presented by:



Ice Breaker!

Who do we have in the room today?

- **Question:** In the chat, share what experience you have had with assessments in the Amplify Science curriculum.



Amplify's Purpose Statement

Dear teachers,

You do a job that is nearly impossible and **utterly essential**.

We are in your corner – extending your reach, saving you time, and enhancing your understanding of each student.

Thank you for working with us to craft rigorous and riveting learning experiences for your classroom.

We share your goal of **inspiring all students to think deeply, creatively, and for themselves.**

Sincerely,
Amplify

Schoology

- To join Amplify ES Group: W4PK-W466-63F5B



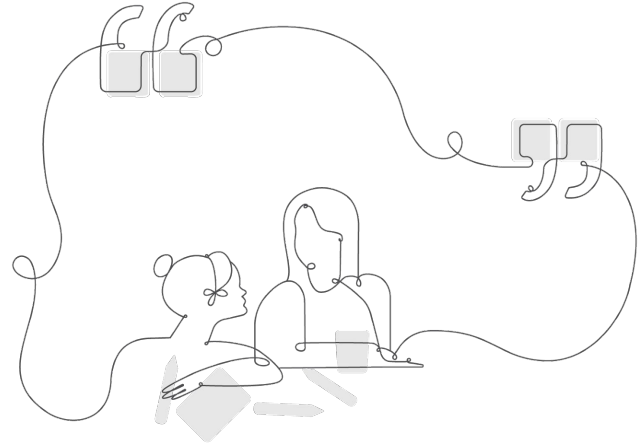
Upcoming LAUSD Office Hours

Last working Monday of the month

Next Office Hour:

January 31, 2022

- Monday, (4-5pm)



<https://meet.google.com/uwc-uuaz-qdc?authuser=0>

Part 1



Plan for the day: Part 1

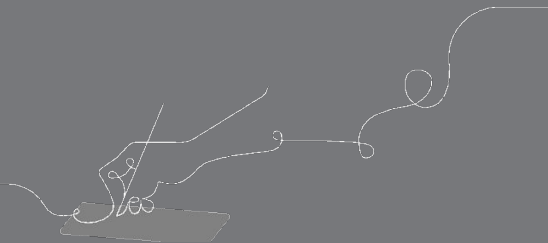
- Introduction and Framing
- Unit Overview
- Formative Assessments
- Closing

Overarching goals

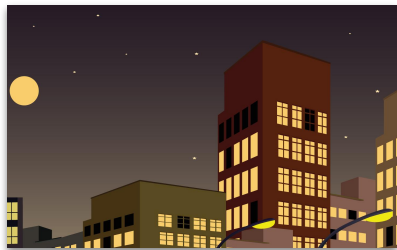
By the end of this workshop, you will be able to:

- ❑ Internalize the unit
- ❑ Describe the overall structure of the Assessment System
- ❑ Describe the overall structure and purpose the Formative Assessments.

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Year at a Glance: Grade 4

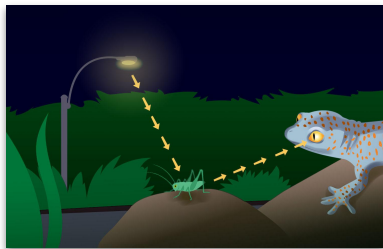


Energy Conversions

Domain: Physical Science

Unit type: Engineering Design

Student role: System engineers



Vision and Light

Domain: Life Science

Unit type: Investigation

Student role: Conservation biologists

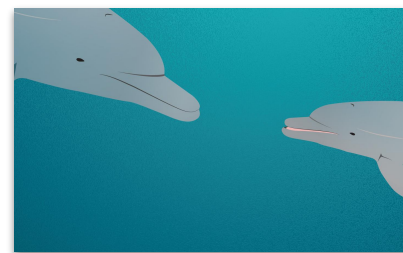


Earth's Features

Domain: Earth and Space Science

Unit type: Argumentation

Student role: Geologists



Waves, Energy, and Information

Domain: Physical Science

Unit type: Modeling

Student role: Marine scientists

Amplify Science Approach





Plan for the day: Part 1

- Introduction and Framing
- **Unit Overview**
- Formative Assessments
- Closing

Earth's Features



How do rocks and fossils tell us about the way Earth changes over time?

Earth's Features

Problem: What was the environment of this place like in the past?

Role: Geologists

Students help the director of Desert Rocks National Park explain how and when a particular fossil formed and how it came to be in its current location.

Earth's Features

Coherent Storylines



Chapter 1: How did the fossil get inside the rocky outcrop?

6 Lessons



Chapter 2: What was the environment of Desert Rocks National Park like i...

6 Lessons



Chapter 3: What is the order of the past environments of Desert Rocks...

5 Lessons



Chapter 4: Why did more rock layers get exposed in Desert Canyon than Keller...

5 Lessons

Explaining the phenomenon: Science Concepts



What **science concepts** do you think students need to understand in order to **explain the phenomenon?**

Earth's Features Progress Build

Prior knowledge (preconceptions): Students are expected to have had many everyday experiences with rocks and sediment.

Level 3

The lowest layer of sedimentary rock formed first, and younger layers formed on top.

Level 2

Different sedimentary rock forms in different environments.

Level 1

Sedimentary rock forms when sediment piles up and hardens over time. Fossils can form in the rock if organisms are buried in the sediment.

Prior knowledge

Deep, causal understanding

Key Unit Guide Documents for Planning

Planning for the Unit	Printable Resources
Unit Overview ▾	Coherence Flowcharts
Unit Map ▾	Copymaster Compilation
Progress Build ▾	Flexextension Compilation
Getting Ready to Teach ▾	Investigation Notebook
Materials and Preparation ▾	Multi-Language Glossary
Science Background ▾	NGSS Information for Parents and Guardians
Standards at a Glance ▾	Print Materials (8.5" x 11")
Teacher References	
Lesson Overview Compilation ▾	Print Materials (11" x 17")
Standards and Goals ▾	Offline Preparation Teaching without reliable classroom internet? Prepare unit and lesson materials for offline access. Offline Guide
3-D Statements ▾	
Assessment System ▾	
Embedded Formative Assessments ▾	
Books in This Unit ▾	
Apps in This Unit ▾	
Flexextensions in This Unit ▾	

Core Unit Planning & Internalization

Unit Title:

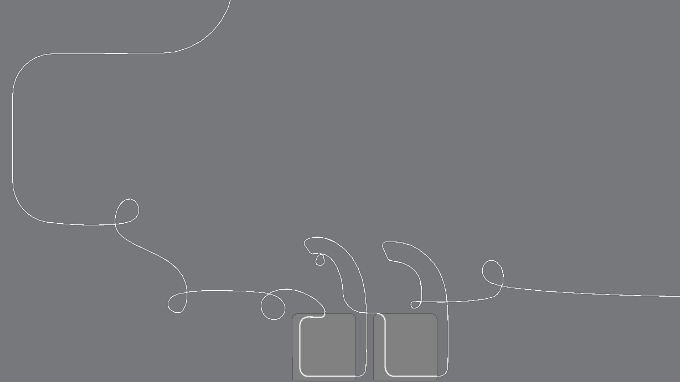
Earth's Features

Overview

[Resources: Unit Overview, Teacher's Guide, Coherence Flowchart, Unit Map, 3-D Statements]

<p>What is the phenomenon/real-world problem students are investigating in your unit?</p> <p>What was the environment of this place like in the past?</p>	<p>Student Role:</p> <p>Geologists</p>
<p>Unit Question:</p> <p>How do rocks and fossils tell us about the way Earth changes over time?</p>	<p>Relationship between the Unit Phenomenon and Unit Question:</p> <p>The study of a dinosaur fossil in a rocky outcrop provides a great context for beginning to understand how geologists can use fossils and rock to determine what a place was like in the past.</p>
<p>By the end of the unit, students figure out...</p> <p>Lower rock layers form first, and new rock layers form on top of them, so lower rock layers are older than the layers above them. This means that the siltstone layer formed first, then the mudstone layer, and then the shale layer. Therefore, the environment was a floodplain first, then a deep ocean, and then a shallow ocean.</p>	
<p>How do students engage with three-dimensional learning to figure out the phenomenon/real-world problem in your unit?</p> <p>Students obtain information from text and use physical and digital models to construct understanding about how rock forms and erodes, how rock layers form, and how to use rock layers to infer the environmental changes that have happened in a place (stability and change). They apply their understanding to engage in oral and written argument about the geologic history of Desert Rocks National Park.</p>	

Questions?





Plan for the day: Part 1

- Introduction and Framing
- Unit Overview
- **Formative Assessments**
- Closing

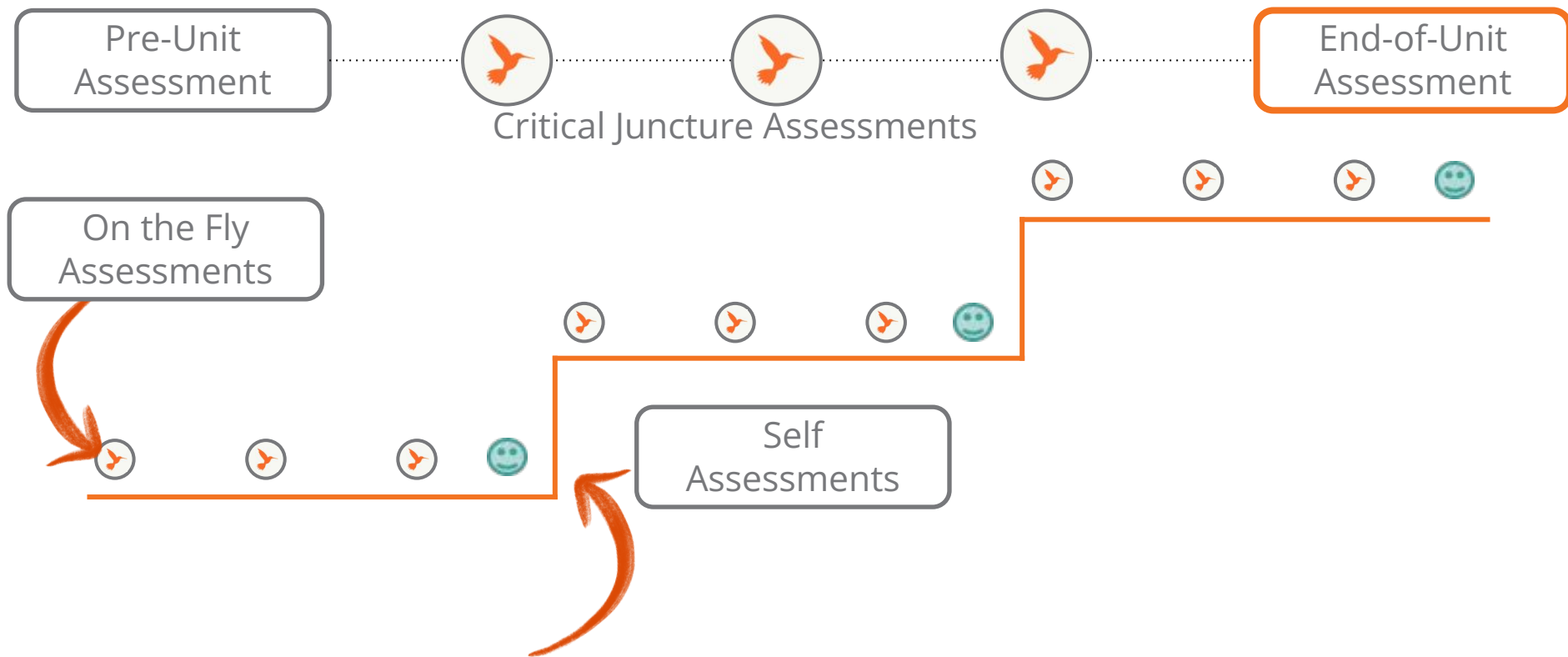
Why do we assess our students?



Why do we assess our students?



K-5 Assessment System



Earth's Features Progress Build

Assumed prior knowledge (preconceptions): Students are expected to have had many everyday experiences with rocks and sediment.

What new ideas are added at Level 2?

Level 1

Sedimentary rock forms when sediment piles up and hardens over time. Fossils can form in the rock if organisms are buried in the sediment.

What new ideas are added at Level 3?

Level 2

Different sedimentary rock forms in different environments.

Level 3



The lowest layer of sedimentary rock formed first, and younger layers formed on top.

Prior knowledge


Deep, causal understanding

Progress Build analysis Work time

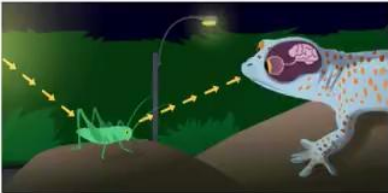
Read and analyze your
unit's Progress Build.




4th Grade Science Eng/Esp ▼



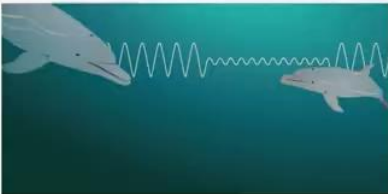
22 Lessons
Energy Conversions



22 Lessons
Vision and Light



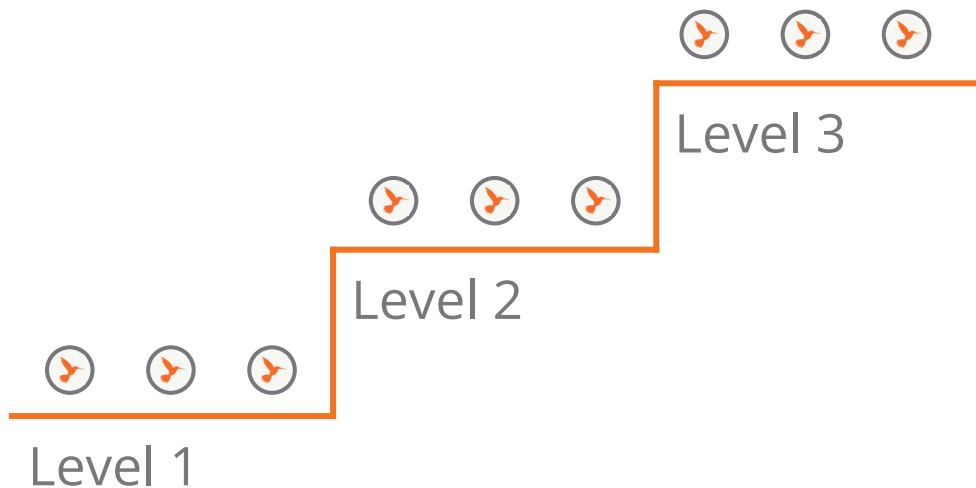
22 Lessons
Earth's Features



22 Lessons
Waves, Energy, and Information

On-the-Fly Assessments

- Track student progress within a Progress Build level
- Embedded into instruction
- Assessment resource includes “Look for” and “Now what”





Grade 4 | Earth's Features

Lesson 1.2: Clues from the Past

Activity 1

Introducing Observations and Inferences





Chapter 1 Question

How did the fossil get inside the rocky outcrop?



We will think about how **geologists use clues** to figure out what a place was like in the past.

We can use this example to practice using clues to figure things out.

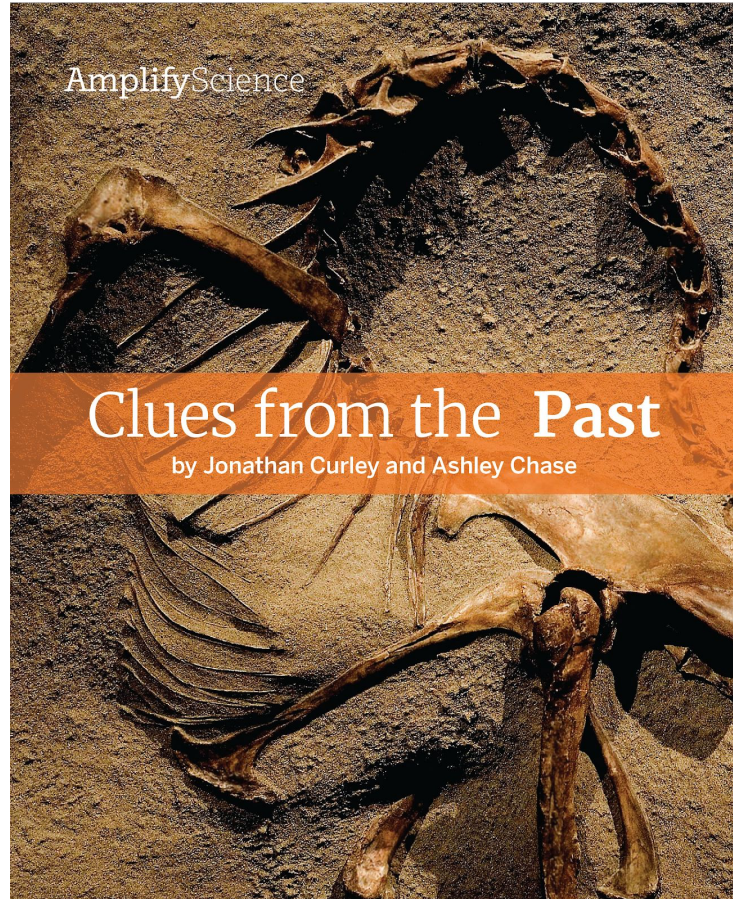


Geologists **observe clues**, like fossils and rocks, and use ideas about science they already know to **make inferences** about what might have happened in a place in the past.

Activity 2

Preparing to Read Clues from the Past





We will read a book about a **real geologist** who found a **surprising fossil**—like the mystery fossil in Desert Rocks Canyon.

Activity 3

Partner Reading



Partner Reading Guidelines

1. Sit next to your partner and place the book between you.
2. Take turns reading.
3. Read in a quiet voice.
4. Be respectful and polite to your partner.
5. Ask your partner for help if you need it. Work together to make sure you both understand what you read.

Name: _____ Date: _____

Reading About the Work of a Geologist: *Clues from the Past*

- 1. Reread each page from *Clues from the Past* listed in the table below.
- 2. For each page, record an observation that Dr. Coria made of *Argentinosaurus*.
- 3. For each observation, record the inference that he made.
- 4. In the last row, choose another observation and inference from the book to record. Be sure to record the page number in the first column.

Observations of <i>Argentinosaurus</i>	Inferences about <i>Argentinosaurus</i>
Page 11:	
Page 12:	
Page 13:	

Turn to page 5 in your notebooks.

You will **record observations and inferences** that Dr. Coria made. We'll do the first one together.

Activity 4

Sorting Observations and Inferences



Remember that an **observation** is something you notice using any of your five senses.

An **inference** is something you figure out based on observations and information you already know.



For example, “I see there is an eggshell in a nest” is an **observation**.

“A bird hatched out of the egg” is an **inference**.



We will now have a chance to think carefully about the **difference between an observation and an inference** about the fossil.

Observations

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Inferences

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The fossil is surrounded by brown rock.

This animal was covered with sediment.

The fossil is 7 cm (2.76 inches) long.

The fossil is from an animal that hopped.

This fossil is a frog.

The fossil is a skeleton.

The animal lived near water.

The fossil has two short legs and two long legs.

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You will get a set of **statements about the fossil** and **two labels** that say “Observations” and “Inferences.”

On-the-Fly Assessment 1:

Now what? For students who are struggling to sort the statements, **ask them about one of the statements at a time, while presenting a series of questions to guide their decisions.**

- “Is this statement something that can be observed with the five senses? Which senses?”
- “Would I need to know something about animals or rocks to make this statement? Would somebody who had never before seen something similar to this animal be able to make this statement?”
- “Would I need to make comparisons to other things I know already to make this statement?”

Helping students reflect on what information they are using to sort each statement can **help them decide whether it is an observation made using the five senses or an inference made using background knowledge.** You can also make parallel observations and inferences about objects in the room and explain what makes each statement an observation or inference.

Additional formative assessment information

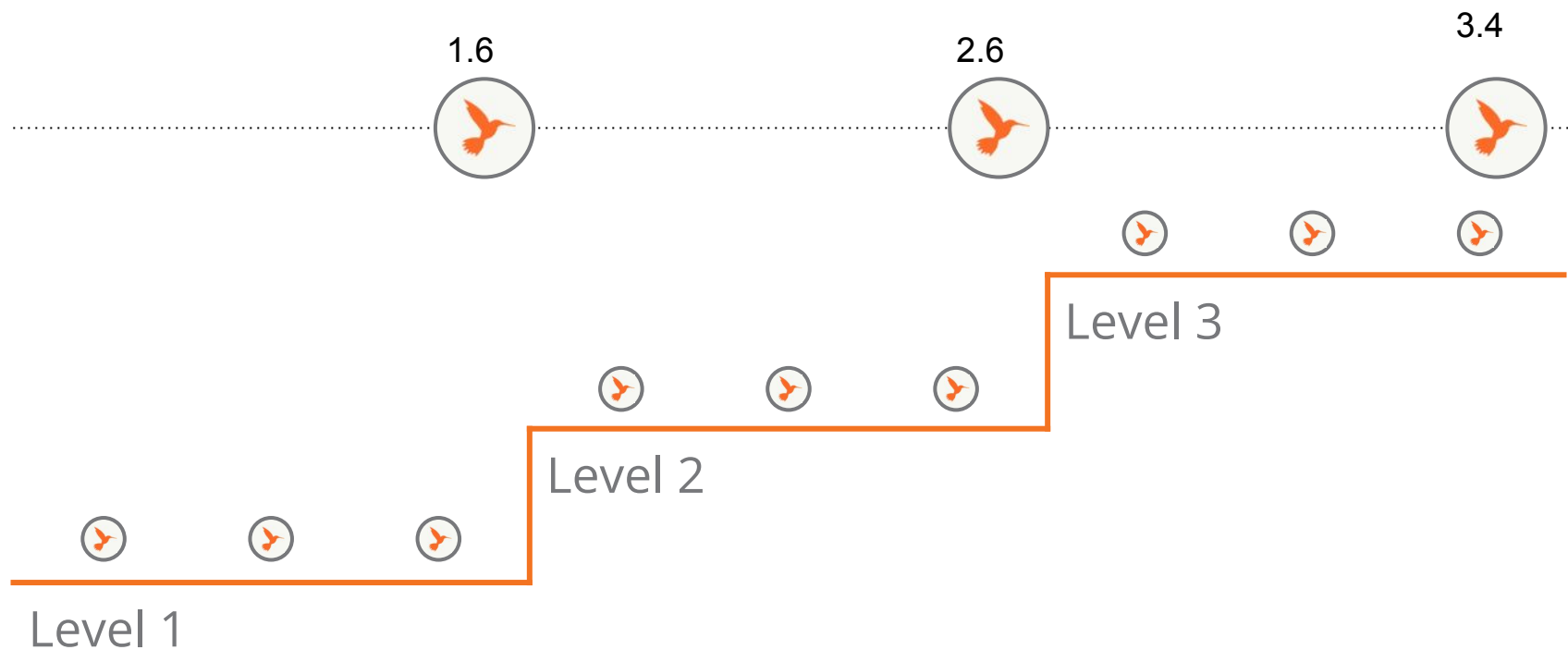
On-the-Fly Assessments

In addition to assessing concepts in the Progress Build, some On-the-Fly Assessments provide data about:

- Science and Engineering Practices
- Crosscutting Concepts
- Literacy skills
- Student collaboration

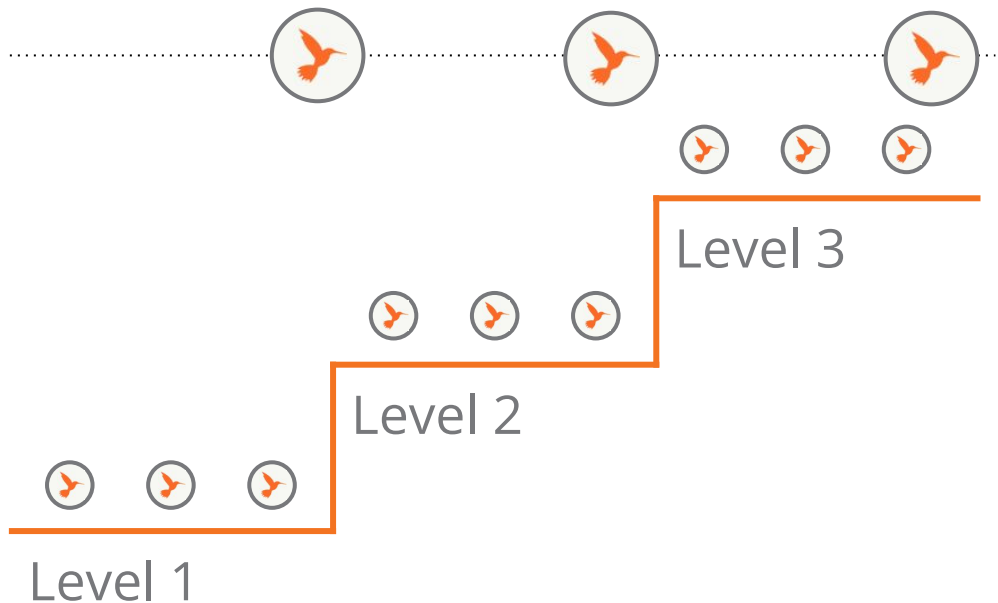


Critical Juncture Assessments



Critical Juncture Assessments

- Track student progress between Progress Build levels
- Embedded into instruction
- Assessment resource includes “Assess Understanding” and “Tailor Instruction”





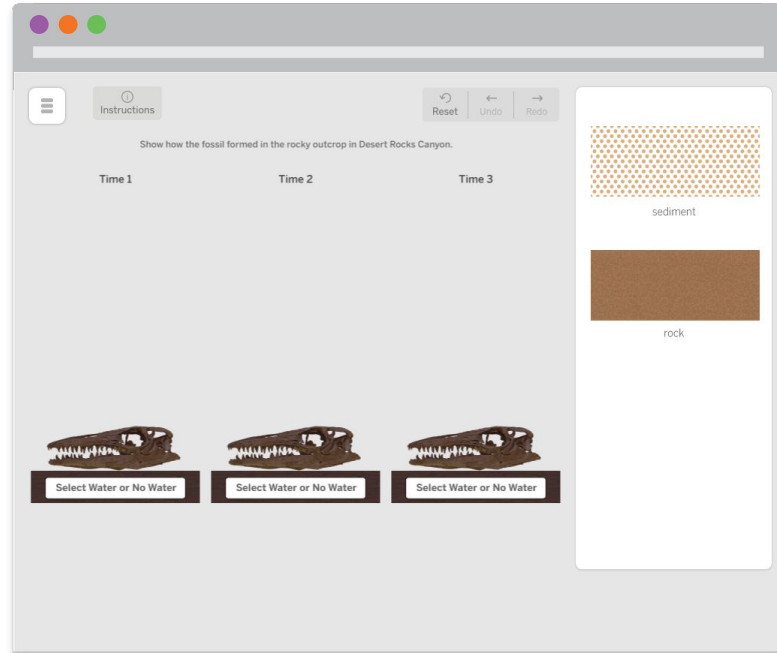
Grade 4 | Earth's Features

Lesson 1.6: Writing a Scientific Argument

Activity 1

Modeling Fossil and Sedimentary Rock Formation

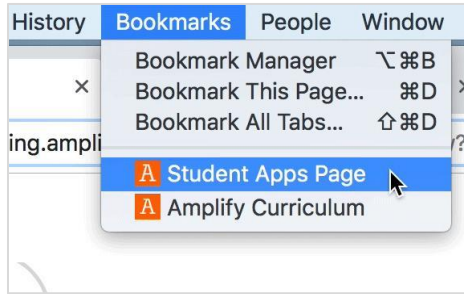




We want to be able to explain what Desert Rocks National Park was like in the past.

First, we will use a digital tool to build a model showing our ideas.

Open the Modeling Tool



Step 1

Click on the **Student Apps Page** in your bookmarks.



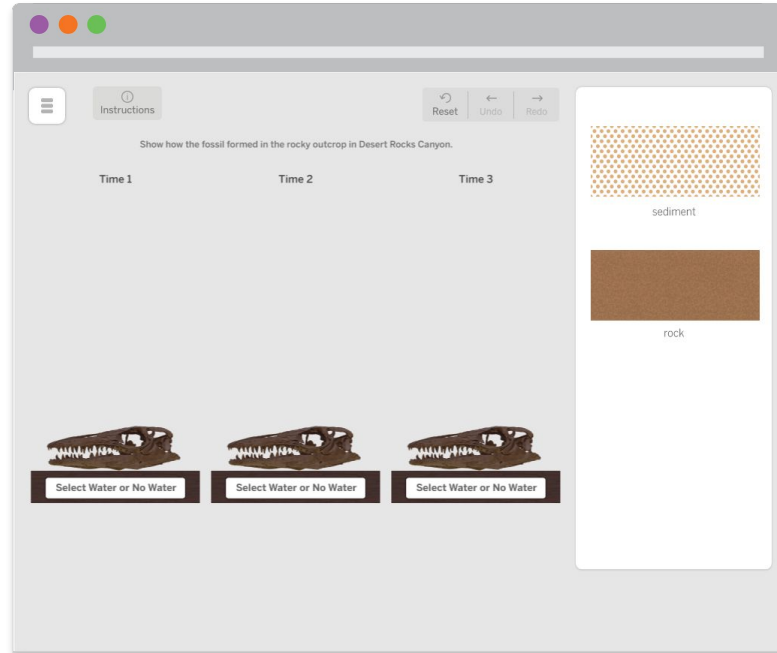
Step 2

Scroll down and click on the ***Earth's Features unit.***

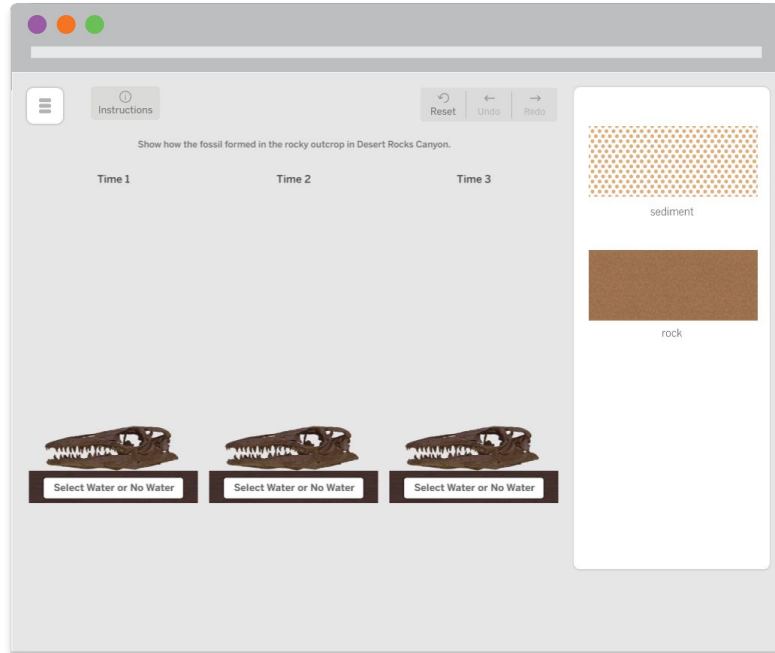


Step 3

Click on the **blue box with a 1** to access the Modeling Tool.



Complete the model to show how the fossil formed in the rocky outcrop in Desert Rocks Canyon.



Exchange models with another pair.

Notice and **discuss** any differences between your models.

Critical Juncture Assessment 1:

Tailor instruction: For students who are not yet demonstrating understanding, you can **review the different models and experiences** students have engaged with so far in the unit. Asking students to compare the similarities can help them synthesize their understanding. First, **compare the Sim and pages 7–8 of *Clues from the Past* to the rock models students completed in Lesson 1.5.** Can they explain how each image from page 7 aligns to a step they took with their models? Can they explain what would happen to an organism that was on the surface when a layer of sediment built up? Once students have described the steps of rock formation, you can ask them to **make predictions in the Sim:** What will happen if you move time forward once? What will happen if you select it twice? Once students feel comfortable predicting in the Sim, they should be able to make generalizations about how rock and fossils formed in the rocky outcrop.

Additional formative assessment information

Locating assessment resources

Full text of assessment

- Embedded Formative Assessments document
- Instructional guide
- Classroom Slides notes



Lesson 1.2: Clues from the Past

Activity 4

Sorting Observations and Inferences



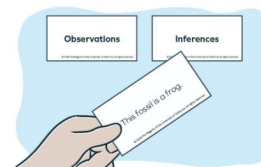
Step 1

Read each statement about the fossil with your partner.



Step 2

Talk about whether you think it is an observation of the fossil or an inference about the fossil and why you think so.



Step 3

Decide together if you should place each statement under the "Observations" label or the "Inferences" label.

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ON-THE-FLY



Additional formative assessment information

Locating assessment resources

Full text of assessment

- Embedded Formative Assessments document
- Instructional guide
- Classroom slides notes

Additional resources

- Lesson Brief: Digital Resources

Lesson 1.6:
Writing a Scientific Argument

2 STUDENT-TO-STUDENT DECISION Evidence Circles

3 WRITING Shared Writing of a Scientific Argument

GENERATE PRINTABLE LESSON GUIDE

Overview

In this lesson, students consider initial ideas, formal claims, and evidence related to the mystery in Desert Rocks National Park and the question *How did the fossil get inside the rocky outcrop?* First, pairs of students use a digital Modeling Tool to answer this question and then individually explain what the model shows. Students are then introduced to scientific argumentation by looking at an example argument. They learn that an argument consists of a claim supported by evidence. The teacher then presents a claim from the park director: *Desert Rocks National Park used to be underwater.* Students receive and discuss evidence that supports the claim in small groups using the Evidence Circles discourse routine. The teacher then models writing an argument with input from the students. This lesson allows students to engage in the practice of argumentation as well as to apply what they have learned about environments in the past to

Digital Resources

- Classroom Slides 1.6 | PowerPoint
- Classroom Slides 1.6 | Google Slides
- All Projections
- Classroom Videos 1.6 | Zip
- Scientific Language for Writing Arguments
- Scientific Argument: Past Environment of Desert Rocks National Park chart
- Earth's Features Investigation Notebook, pages 17–21

Additional formative assessment information

Possible student responses

- Within assessments:
 - “Look fors” (OtF)
 - “Assess Understanding” (CJ)
- Possible responses within the Instructional Guide
- Digital resources
 - Assessment Guides
 - Teacher References

The screenshot shows the AmplifyScience interface for Lesson 1.6, 'Earth's Features'. The top navigation bar includes 'Lesson Brief (3 Activities)', '1 MODELING TOOL Modeling Fossil and Sedimentary Rock...', '2 STUDENT-TO-STUDENT DISCUSSION Evidence Circles', and '3 WRITING Shared Writing of a Scientific Argument'. The main content area is titled 'Modeling Fossil and Sedimentary Rock Formation' and includes the text: 'Students use a digital Modeling Tool and writing to demonstrate their understanding of fossil and sedimentary rock formation.(25 min)'. Below this, there are four tabs: 'Step-by-step', 'Teacher Support', 'Possible Responses' (which is circled in orange), and 'My Notes'. The 'Possible Responses' tab contains the following text:

A proficient student response will show:

- Students place sediment and rock images in each of the three columns as shown below.
 - The Time 1 column shows that over time a dead organism underwater would be covered in sediment.
 - The Time 2 column shows that the sediment layer becomes rock when it is covered by more sediment.
 - The Time 3 column shows that the rock layer becomes thicker when more sediment is added on top.
- Students should include water in all three columns to show that sedimentary rock formation occurs when sediment sinks through water.

Investigation Notebook
Fossil in the Rocky Outcrop Model (page 18)

Describe what is happening at all three times in your model to explain how the fossil got into the rocky outcrop.

Embedded formative assessments

On-the-Fly and Critical Juncture Assessments

1. Use the Embedded Formative Assessments document to get familiar with On-the-Fly and Critical Juncture Assessments in your unit.
2. Download the classroom slides for a lesson with an On the Fly assessment or Critical Juncture.
3. Read through the teacher notes and make note of any possible student responses. (You can copy and paste them into your notes for that slide.)

Earth's Features
Teacher References

Embedded Formative Assessments

This is also an opportunity to assess how students are able to make inferences by combining observations of the rock with scientific ideas from the Sim. Even though students did not observe their rock sample form, they should be able to combine their observations of the rock sample with their understanding of how rocks form to infer that it formed when sediment built up and was covered with more sediment.

Now what? If students seem to have trouble understanding how sedimentary rock forms, discuss this with the class using the Sim. Project the Sim in Mode 1. Without changing the environment, move time forward. Point out the sediment building up in the beach environment. Ask students to keep their eyes on the sediment in the beach environment as you move time forward again. Point out that as more sediment piles on top, the sediment below forms into solid rock. Reset the Sim and then move time forward twice again, this time asking students to watch the floodplain environment. Point out that in the Sim, sedimentary rock only forms where the sediment can build up underwater. Reset the Sim once more and ask students to watch what happens to the upper river environment as you advance time forward. They should notice that no rock forms in this environment where the sediment is not underwater.

NGSS connection: This formative assessment reveals student knowledge and use of Disciplinary Core Idea ESS.LC: The History of Planet Earth.

Additional 3-D Assessment Opportunities

This is an early opportunity to assess students on the practice of Constructing Explanations and Designing Solutions (SEP 6). Listen for students to use evidence to construct an explanation for how this rock formed. Students should be able to combine evidence from their observations of the rock sample with evidence from the Sim about how rocks form to explain that it formed when sediment built up and was covered with more sediment.

See the *Earth's Features* Crosscutting Concept Tracker (in Digital Resources for Lesson 1.1) to track student progress across the unit with the crosscutting concept of Stability and Change, and for prompts that can be used to elicit further evidence of student understanding of the crosscutting concept.

Lesson 1.6, Activity 1

Critical Juncture Assessment 1: How the Fossil Got Inside the Rocky Outcrop

Assess understanding: In Activity 1, students create a model and explain it in their notebooks to answer the question *How did the fossil get inside the rocky outcrop?* The purpose of this Critical Juncture is to gauge students' understanding of how fossils and sedimentary rock form. Students should demonstrate understanding of the following critical concepts in their responses on the notebook page:

- Fossils form when an organism is covered by sediment.
- Sedimentary rock forms from sediment that has built up underwater.
- When sediment is buried by other sediment, it can compact and cement into a layer of rock.
- Over time a sedimentary rock layer gets thicker and thicker, as more sediment piles up and is buried.

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Additional formative assessment information

Student Self-Assessments

- End of each chapter
- Grades K-1: Pair Share activity
- Grades 2-5: Independent Investigation Notebook activity



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Name: _____ Date: _____

Chapter 1: Check Your Understanding

This is a chance for you to reflect on your learning so far. This is not a test. Be open and truthful when you respond.

Scientists investigate in order to explain how or why something happens. Am I getting closer to figuring out how rocks and fossils can tell us about what Desert Rocks National Park was like in the past?

I understand how the fossil in the rocky outcrop formed. ☐ Yes ☐ Not yet

I understand how the rock layers in the rocky outcrop formed. ☐ Yes ☐ Not yet

I understand what makes the rocks in the layers different from one another. ☐ Yes ☐ Not yet

I understand how a rock layer in the rocky outcrop can help me figure out what Desert Rocks National Park was like in the past. ☐ Yes ☐ Not yet

I understand how to figure out the order of past environments in Desert Rocks National Park. ☐ Yes ☐ Not yet

I understand that science is both what we know about the world and how we learn about the world. ☐ Yes ☐ Not yet

What are you still wondering about rocks, fossils, and past environments?

Data Collection Tool

Student res

Teacher:

Unit Name:

Directions:

1. Navigate to the lesson.
2. Select the embedded What?.
3. Determine the Look for below:
 - a. Look for 1: _____
 - b. Look for 2: _____
 - c. Look for 3: _____
 - d. Look for 4: _____
 - e. Look for 5: _____
4. Use the chart below described above.
5. Place a plus (+) if student backsplash (/) if student demonstrates no understanding.
6. After data collection is complete, the Now What? for id _____

Grade 2: Plant and Animal Relationships
Lesson 2.1: Activity 4 Debriefing Plant Parts (OTF)

Look for 1: A plant is a system made up of different parts (leaves, stems, roots).

Look for 2: Each plant part has a unique role so that the plant can live and grow.

Student Name	Look for 1	Look for 2	Notes
Jennifer		X	Named roots as the only part that had a role in keeping the plant alive
Michael			
Trent	X	X	Didn't identify a plant as a system w/parts
Adelina			
Wanda		X	Didn't identify a plant as a system w/parts
Jonathan			
William			
Zena		X	Didn't identify a plant as a system w/parts
Christine			
Dorothy	X	X	Didn't identify a plant as a system w/parts
Laura		X	Didn't describe parts as having unique roles
Shawn			
Anthony			
Tristian	X	X	Didn't identify a plant as a system w/parts

[illegible]

Jamboard

What did you learn about these assessments?

On the Fly

Critical Juncture



Plan for the day: Part 1

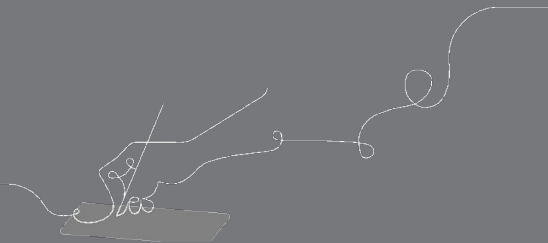
- Introduction and Framing
- Unit Overview
- Formative Assessments
- Closing

Overarching goals

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

- ❑ Internalize the unit
- ❑ Describe the overall structure of the Assessment System
- ❑ Describe the overall structure and purpose the Formative Assessments.

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Additional resources

Welcome, caregivers!

We hope you enjoy learning more about Amplify Science and what students are learning in science this year.

[Para acceder a este sitio en español haga clic aquí.](#)

Amplify welcomes you and your learner to the Science program for the new school year. We are very excited to



Grades 6-8



[Caregivers](#)

LAUSD Microsite-
<https://amplify.com/lausd-science>



Welcome to Amplify Science!

This site contains supporting resources designed for the LAUSD Amplify Science adoption for grades TK–8.

- Access the [Amplify Science Program Hub](#) (To help orient you to the new design, watch this [video](#) and view this [reference guide](#).)
- Find out more about [Amplify Science@Home](#)
- Share the [Caregiver Hub](#) (Eng/Span) with your families
- For LAUSD ES Teachers- [Amplify Science & Benchmark Advance Crosswalk](#)
- Instructional guidance for a [Responsive Relaunch of Amplify Science in 21-22](#)

Click the button below to preview the digital Teacher's Guide, and check back for exciting updates to this site!

Additional resources and ongoing support

Customer Care

Seek information specific to enrollment and rosters, technical support, materials and kits, and teaching support, weekdays 7AM-10PM EST and weekends 10AM-6PM EST.



help@amplify.com



800-823-1969



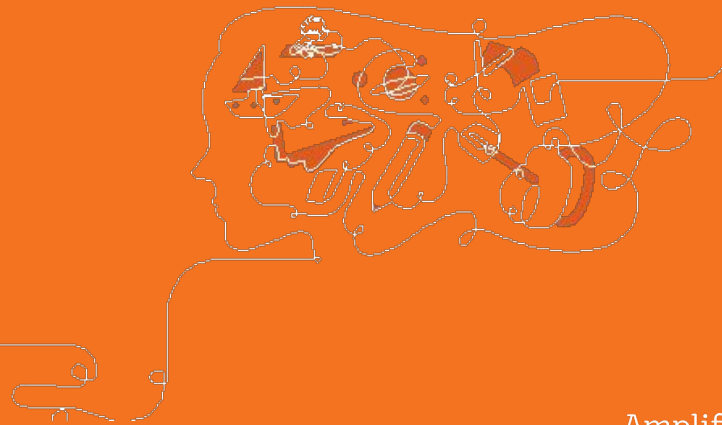
Amplify Chat



End of Part 1

Break

10:00 - 10:30



Amplify Science

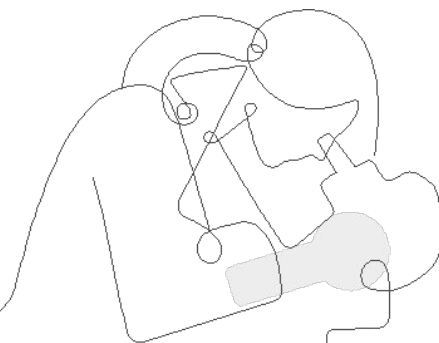
Unit 3 Earth's Features (with an assessment focus)

Grade 4, Part 2

School/District Name: LAUSD

Date:

Presented by:



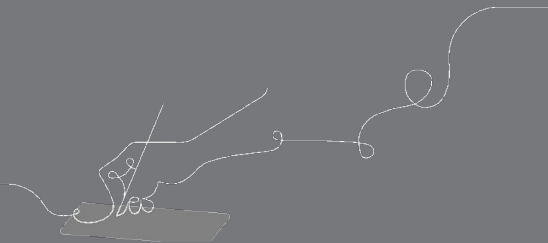
Part 2

Overarching goals

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

- ❑ Understand the pre and post assessments in this unit.
- ❑ Understand how the formative assessments build to the summative assessment.

e





Plan for the day: Part 2

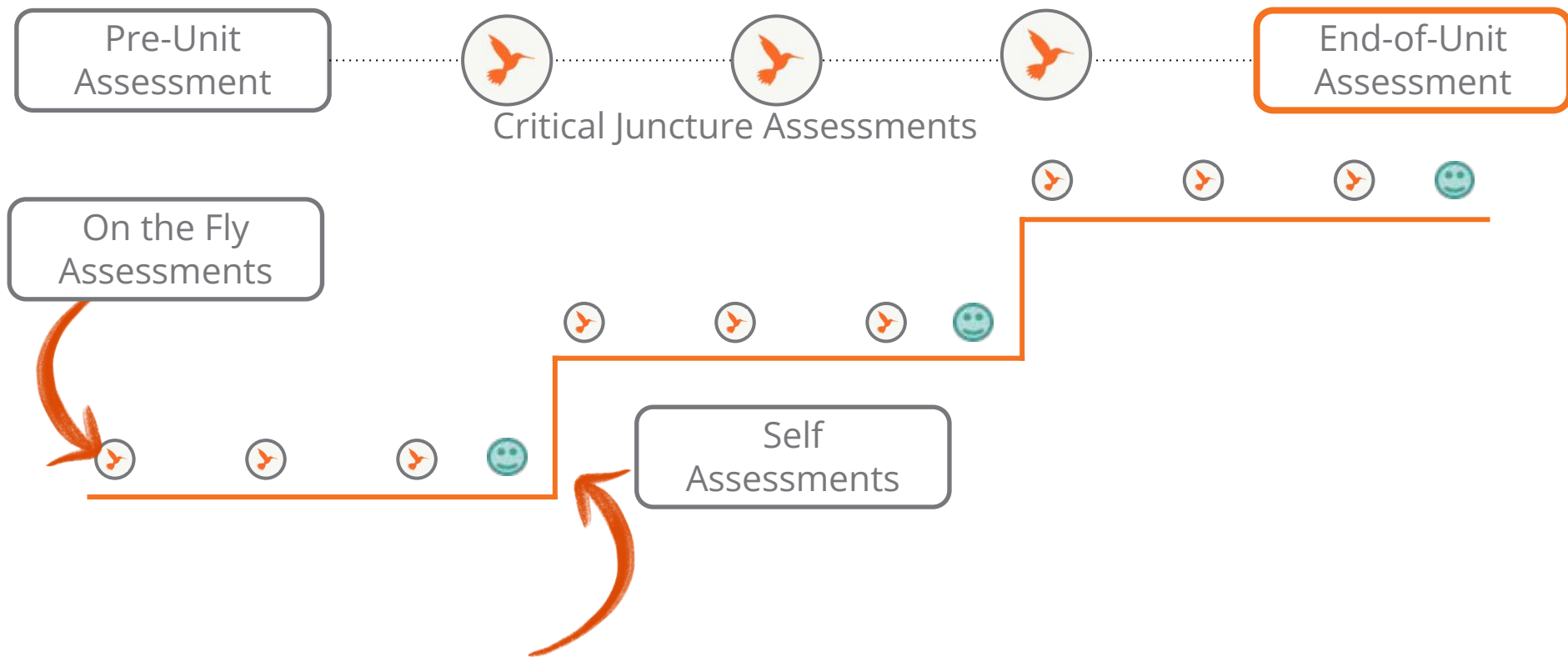
- Pre Unit Assessment
- Summative assessment
- Closing



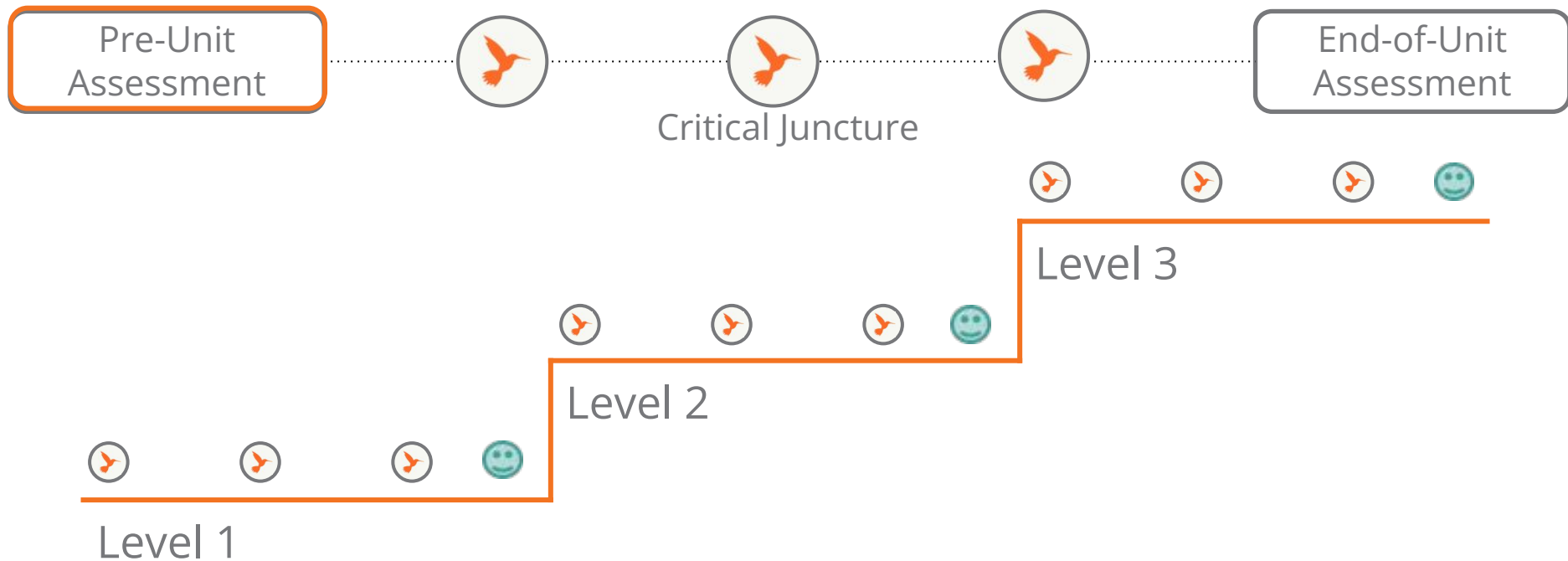
Plan for the day: Part 2

- Pre Unit Assessment
- Summative assessment
- Closing

K-5 Assessment System



K-5 Assessment System





Grade 4 | Earth's Features

Lesson 1.1: Pre-Unit Assessment

Activity 1

Mystery in Desert Rocks Canyon



We're about to begin a new science unit during which we'll learn about how **Earth** can **change** over **long periods of time**.

This is Desert Rocks National Park. We will **investigate** how this place has changed over time.





1 ?

This is what was found.

Thinking about **what this is** and **how it got there** may give us some clues about what this place was like in the past.



In this unit, we will do what **geologists** do: gather information to think about what a place was like in the past.

Vocabulary



geologist

**a scientist who studies the processes and materials that
form the solid part of Earth**



Unit Question

How do rocks and fossils tell us about the way Earth changes over time?

Activity 2

Writing Initial Explanations





This unit will focus on **fossils** and the **rock** in which they form.

We will be studying fossils and rock as **geologists**.

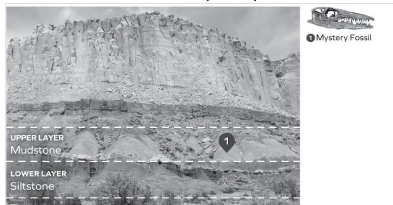
Name: _____ Date: _____

**Pre-Unit Writing:
Explaining the Rocky Outcrop**

A fossil was found in a layer of mudstone in this rocky outcrop in Desert Rocks National Park.

1. Answer the questions in Parts 1, 2, and 3.
2. Be sure to answer all questions as best as you can.

rocky outcrop

**Part 1**

How did this rock with the fossil in it form?

Earth's Features—Lesson 1.1

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1

Earth's Features—Lesson 1.1

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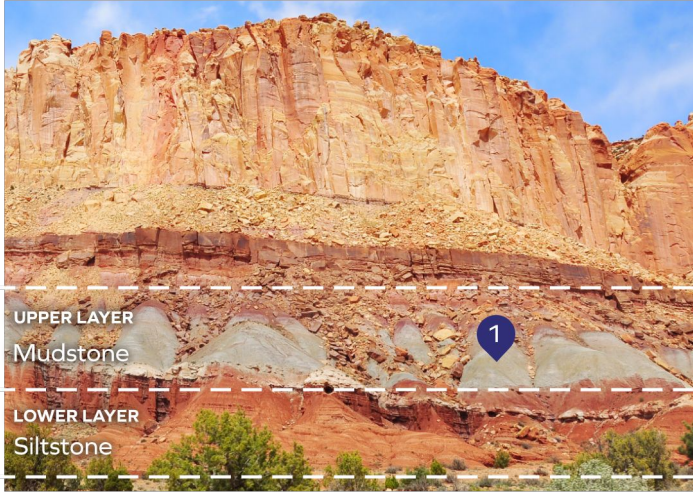
2

Earth's Features—Lesson 1.1

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3

You will **write** your **first ideas** about how the fossil found at Desert Rocks Canyon got into the rock and how you can learn more about what Desert Rocks Canyon was like in the past.



1 Mystery Fossil



Write your ideas about the rocky outcrop.

Activity 3


Rocks and Fossils Anticipatory Chart



Rocks and Fossils


What we know	Questions we have

Thinking about a topic
before you start
investigating can help
make it easier for you to
learn new information.

Rocks and Fossils	
What we know	Questions we have
	



What do you **already know** about rocks and fossils?

Rocks and Fossils	
What we know	Questions we have
	



What **questions** do you have about rocks and fossils?

What do you **wonder** about them?

Activity 4

Exploring the *Earth's Features* Simulation



AmplifyScience

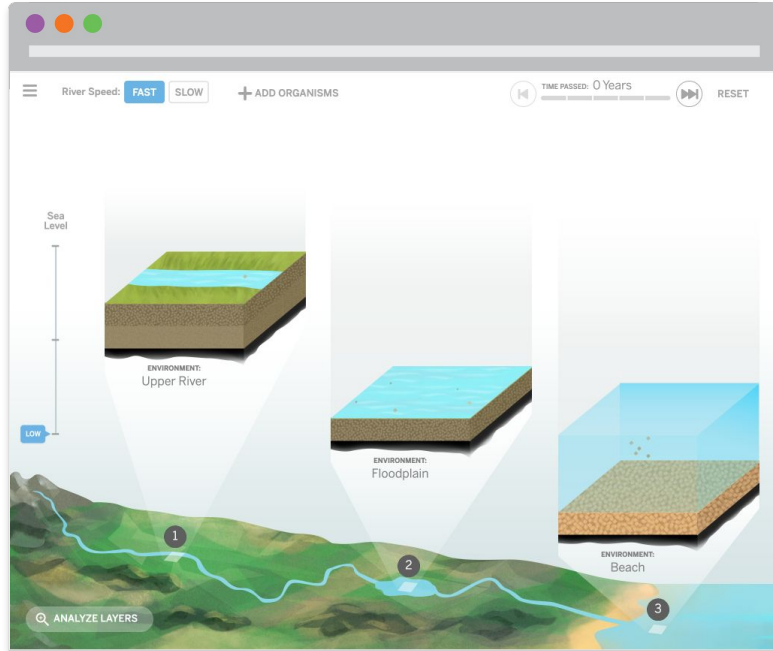


Earth's Features:

Mystery in Desert Rocks Canyon

Investigation Notebook

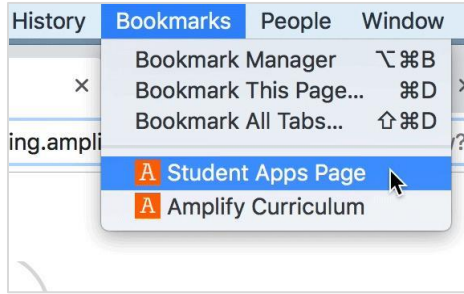
We are going to use an
Investigation Notebook
like scientists use.



Geologists use different **tools** to learn about how Earth changes over time.

We're going to use a digital tool throughout the unit called the ***Earth's Features Simulation***.

Open the Simulation



Step 1

Click on the **Student Apps Page** in your bookmarks.



Step 2

Scroll down and click on the ***Earth's Features unit.***



Step 3

Click on the **orange box marked 1** to access the Sim.

End of Lesson



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Pre-Unit Assessment

Lesson 1.1

Locate the Assessment Guide in Lesson 1.1 of your unit and read it.

Assessment Guide: Interpreting Students' Pre-Unit Explanations About the Rocky Outcrop

This pre-unit writing assessment is an opportunity for students to articulate their initial ideas about how fossils and rocks form and how they can be used to interpret the geologic history of a place. It also provides a baseline for considering student growth over the course of the unit. See the 3-D Assessment Objectives (under Printable Resources) for a summary of how summative and formative assessments across the unit, grade and grade band reveal student knowledge and use of the three dimensions to support progress toward the focal Performance Expectations for this unit.

This pre-unit assessment provides students with an opportunity to connect their background knowledge and the initial ideas they have to the concepts they will be learning about in the *Earth's Features: Mystery in Desert Rocks Canyon* unit. It can also provide insight into students' thinking as you begin this unit of instruction. This will allow you to draw connections to students' experiences and to watch for alternate conceptions that might get in the way of students' understanding. In particular, look for the following:

Connecting to students' experiences. Examples of students' experiences they might reference that you can connect to the content of lessons in the unit include the following:

- seeing fossils exhibited in a natural history museum
- hiking or visiting a national park
- seeing rocks in a river or other moving water

Building on prior knowledge. Examples of ideas that students can build on throughout the unit include the following:

- Fossils are evidence of life from the past.
- Things can build up over time.
- Rock material can be different sizes, such as boulders, pebbles, or sand.

Applying crosscutting concepts. Example of ways students could demonstrate facility with the crosscutting concept of Stability and Change:

- The environment of Desert Rocks National Park could have been different in the past (applying the idea that *some systems appear stable, but can change over long periods of time*).

Gauging students' facility with science practices. Since students write a scientific explanation for this task, it offers an entry-level assessment of student facility with this science and engineering practice. However, because students' work in response to this pre-assessment may be sparse and the unit is focused on the science and engineering practice of Engaging in Argument from Evidence, we recommend using students' first independently written arguments, and corresponding assessment guidance in Lesson 2.6 (Assessment Guide: Reviewing Students' Chapter 2 Arguments About the Environment When the Upper Layer Formed) as an entry-level assessment of this science and engineering practice. Additional entry-level assessments of science and engineering practices and

s can be found in the following lessons: the science and engineering practice of Engaging in Argument from Evidence in Lesson 1.2 (On-the-Fly Assessment 1.2) and the crosscutting concept of Stability and Change in Lesson 2.4 (On-the-Fly Assessment 2.4).

Students' pre-unit explanations that are consistent with accepted scientific understandings include the following:

Change. Because geologic processes take so long, many students might not think of change. However, rock on Earth is constantly changing: new rocks form and old rocks are destroyed. Most rock transformation processes happen at times scales too long for students to observe.

One place doesn't change. Similar to rocks, environments change slowly over time. Students might not understand that one place can transition from an underwater environment to land. However, because of sea transgressions and regressions, as well as the infilling of basins and tectonic activity, the environment in one location can change over time.

Doesn't affect rock. Rock is a very solid, while water and wind are not thought of as powerful. However, moving water or wind can move small pieces of sediment, which can eventually become part of a new rock and can wear the rock down over time.

Same age, which is very old. Students might think of any fossil as representing the same age. However, Earth's nearly four-billion-year-old history of life and the range of fossil ages. In fact, one fossil can be hundreds of millions of years older than another fossil. Fossils range from billions of years old to just 10,000 years old.

Not the same as it is. Some students might think that all the species that are alive now are the same as they were in the past, or that species have never gone extinct. However, new species evolve and old species go extinct regularly over time.

This pre-unit assessment provides an opportunity to formatively assess students' understanding of the following standards:

Writing Practice
Constructing Explanations and Designing Solutions

Earth's Features: Mystery in Desert Rocks Canyon
The study of Planet Earth: The study of Earth and global patterns of rock formations reveal changes over time due to earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (4-ESS1-1)

It
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Earth's Features: Mystery in Desert Rocks Canyon (Grade 4)

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Earth's Features: Mystery in Desert Rocks Canyon (Grade 4)

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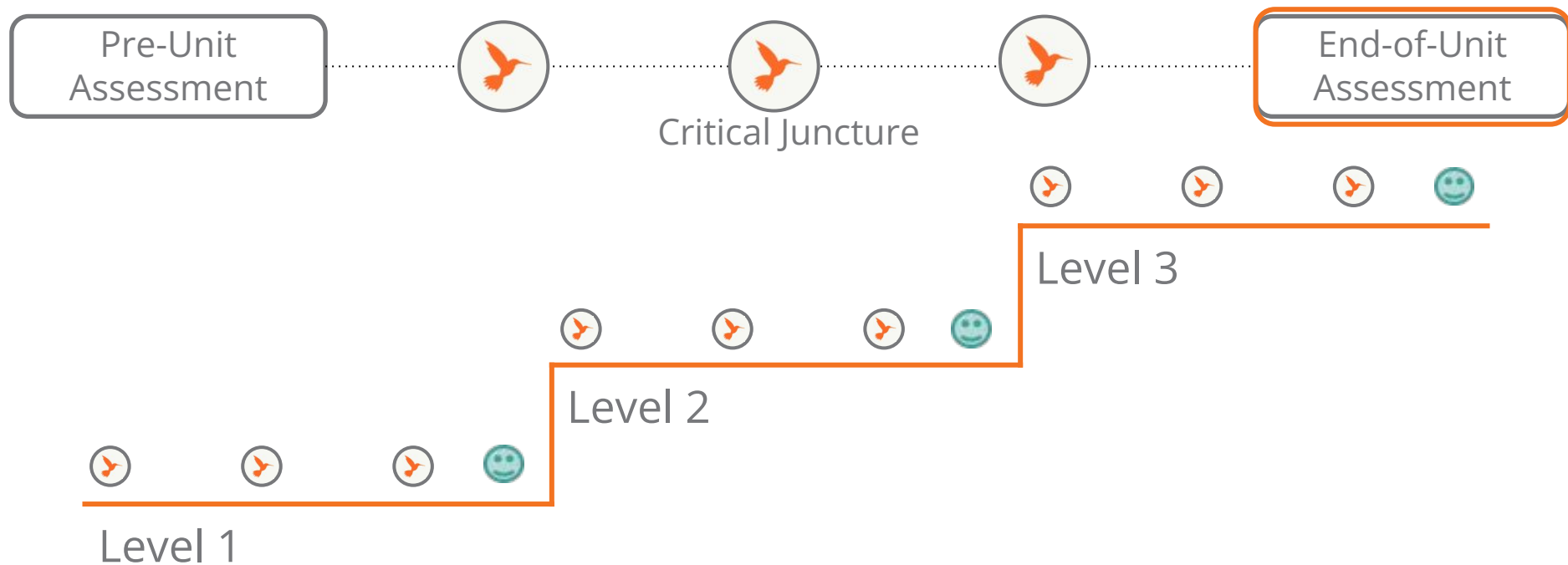
2



Plan for the day: Part 2

- Planning with formative assessments
- Summative assessment
- Closing

K-5 Assessment System



End-of-Unit Assessment

3-dimensional assessment opportunity

- Summative assessment of mastery of science concepts
- Formative assessment of Science and Engineering Practices



There are 2 parts to this summative assessment.

Lesson 4.5- Part 2

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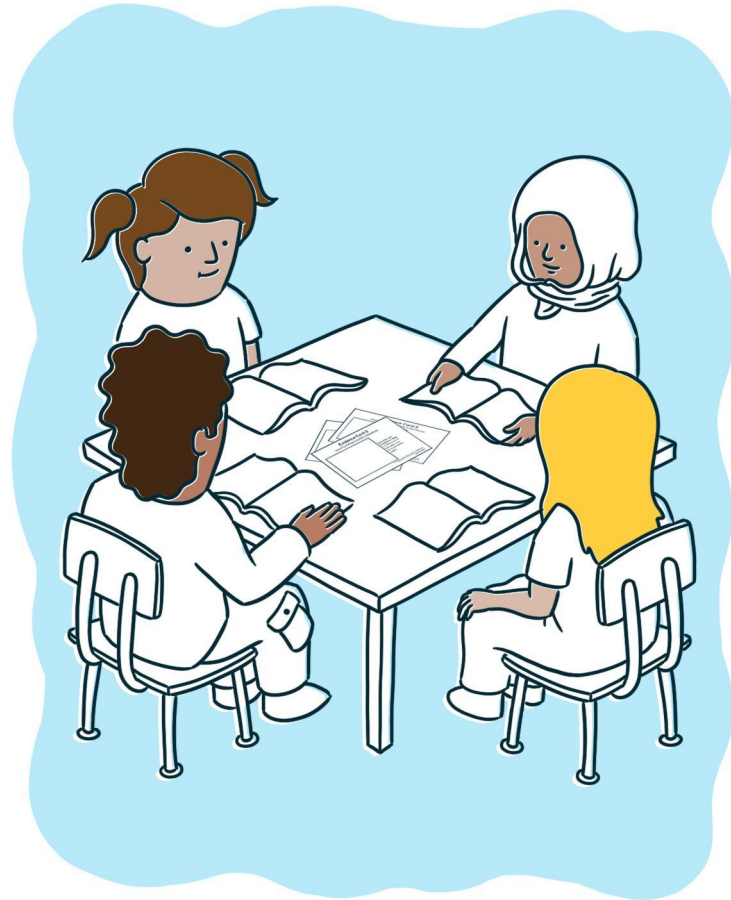
Grade 4 | Earth's Features

Lesson 3.5: Students' Arguments

Activity 1

Evidence Circles





Review the Evidence Cards and begin your Evidence Circles.

Name: _____ Date: _____

Evidence Circles: Rocky Outcrop Unknown Layer

1. Read the question below.
2. Read each Evidence Card carefully. (You may want to take turns reading the cards aloud with your group.)
3. Talk about the evidence. Try to connect related data and ideas together.
4. With your group, make a claim that is supported by the evidence. Record the claim below.
5. If there is no agreement about a claim, discuss reasons your group still disagrees.

Question: What was the environment like when the unknown rock layer formed?

Claim:



After discussing with your group, **write** down a claim that is best supported by the evidence.

Activity 2

Writing an Argument



You will use the evidence that you just discussed to write an argument that answers the question: **What was the environment like when the unknown rock layer formed?**

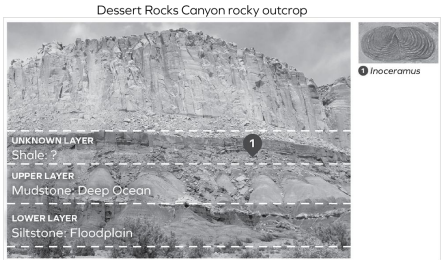
What Is a Scientific Argument?

1. It answers a question with a claim about the natural world.
2. It includes evidence to support the claim. Evidence can be data and ideas.
3. It connects the evidence to the claim by linking different pieces of evidence together to show how they support the claim.
4. It uses scientific language.
5. It is written for an audience.

Name: _____ Date: _____

**End-of-Unit Writing Part 1: Arguing About the Environment
When the Unknown Rock Layer Formed**

- 1. Write a scientific argument that answers Question 1 below.
- 2. Your audience is the park director at Desert Rocks National Park.



Question 1: What was the environment like when the unknown layer formed?

You'll write your arguments on these sheets.

End of Unit Assessment Part 1 Lesson 3.5

There are 2 versions of the assessment


Version A

Name: _____ Date: _____

End-of-Unit Writing Part 1: Scientific Argument About the Environment When the Unknown Rock Layer Formed

1. Write a scientific argument that answers Question 1 below.
2. Your audience is the park director at Desert Rocks National Park.

Desert Rocks Canyon rocky outcrop



UNKNOWN LAYER
Shale: ?

UPPER LAYER
Mudstone: Deep Ocean

LOWER LAYER
Siltstone: Floodplain

(Image credits: left, Shutterstock; right, Gheorghedo via CC-BY-SA 3.0)

Question 1: What was the environment like when the unknown layer formed?

Earth's Features—Lesson 3.5 (Version A)

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Version B

Name: _____ Date: _____

End-of-Unit Writing Part 1: Scientific Argument About the Environment When the Unknown Rock Layer Formed

1. Write a scientific argument that answers Question 1 below.
2. Your argument should include:
 - a claim that answers the question.
 - data and ideas that support the claim.
 - scientific language to connect data and ideas together to support the claim.
3. Your audience is the park director at Desert Rocks National Park.

Desert Rocks Canyon rocky outcrop



UNKNOWN LAYER
Shale: ?

UPPER LAYER
Mudstone: Deep Ocean

LOWER LAYER
Siltstone: Floodplain

(Image credits: left, Shutterstock; right, Gheorghedo via CC-BY-SA 3.0)

Question 1: What was the environment like when the unknown layer formed?

Claim: When the unknown layer formed the environment at Desert Rocks National Park was _____.

Earth's Features—Lesson 3.5 (Version B)

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Locate End of Unit Assessment

Classroom Slides are now available for this lesson!
Find them in the [Digital Resources](#) below.

Lesson 3.5: Students' Arguments

STUDENT
es

2 WRITING
Writing an Argument

RESET LESSON

Overview

In this lesson, students discuss a newly discovered fossil in a different rock layer of the rocky outcrop at Desert Rocks National Park and write about how and in what order the rock layers formed. Students discuss the new evidence in an Evidence Circle in order to make a claim about what the environment was like when the rock layer formed. After a brief whole-class discussion, students complete a two-part writing activity, which serves as Part 1 of the End-of-Unit Assessment. In the first part, students write an argument about what the environment was like when the unknown rock layer formed. In the second part, students determine the order of the three environments they have been investigating. The End-of-Unit Assessment is designed to reveal students' understanding of unit-specific science concepts, the crosscutting concept of Stability and Change, and the practice of engaging in argument from evidence. The purpose of this lesson is for students to demonstrate knowledge of unit content while engaging in the practice of argumentation.

Unit Anchor Phenomenon: A rocky outcrop in Desert Rocks National Park has rock layers and a fossil in it.

Chapter-level Anchor Phenomenon: There are different sedimentary rock layers in Desert Rocks National Park.

Students learn:

Digital Resources

- Classroom Slides 3.5 | PowerPoint
- Classroom Slides 3.5 | Google Slides
- All Projections
- End-of-Unit Writing Part 1: Arguing About the Environment When the Unknown Rock Layer Formed Version A copymaster
- Optional: End-of-Unit Writing Part 1: Arguing About the Environment When the Unknown Rock Layer Formed Version B copymaster
- Assessment Guide: Assessing Students' End-of-Unit Part 1 Arguments About the Environment When the Unknown Rock Layer Formed
- Earth's Features Investigation Notebook, pages 62–66

Digital Resources

Classroom Slides 3.5 | PowerPoint

Classroom Slides 3.5 | Google Slides

All Projections

End-of-Unit Writing Part 1: Arguing About the Environment When the Unknown Rock Layer Formed Version A copymaster

Optional: End-of-Unit Writing Part 1: Arguing About the Environment When the Unknown Rock Layer Formed Version B copymaster

Assessment Guide: Assessing Students' End-of-Unit Part 1 Arguments About the Environment When the Unknown Rock Layer Formed

Earth's Features Investigation Notebook, pages 62–66

Part 2 of this summative assessment is in 4.5.

Name: _____ Date: _____

End-of-Unit Writing Part 1: Scientific Argument About the Environment When the Unknown Rock Layer Formed

- Write a scientific argument that answers Question 1 below.
- Your audience is the park director at Desert Rocks National Park.

Desert Rocks Canyon rocky outcrop

UNKNOWN LAYER
Stratig. ?
Upper layer
Mudstone Deep Ocean
LOWER LAYER
Siltstone Floodplain

1 Inoceramus

Image modified with Shutterstock logo & credit/watermark CC BY-SA 3.0

Question 1: What was the environment like when the unknown layer formed?

Earth's Features—Lesson 3.5 (Version A)

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[illegible]

The background is a stylized, low-poly illustration of a coastal scene. On the left, dark reddish-brown rock formations rise from the water. To the right, the ocean is depicted with light blue and white waves crashing against the shore. The sky is a mix of soft, muted colors like pink, orange, and grey, suggesting a sunset or sunrise. The overall style is modern and artistic.

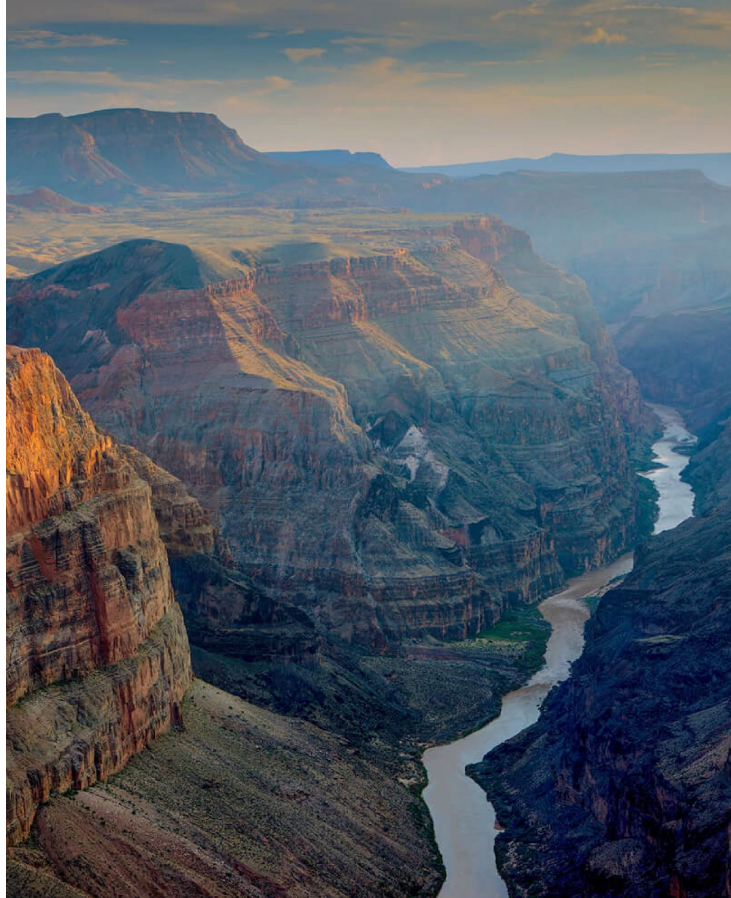
Grade 4 | Earth's Features

Lesson 4.5: Students' Arguments

Activity 1

Stability and Change

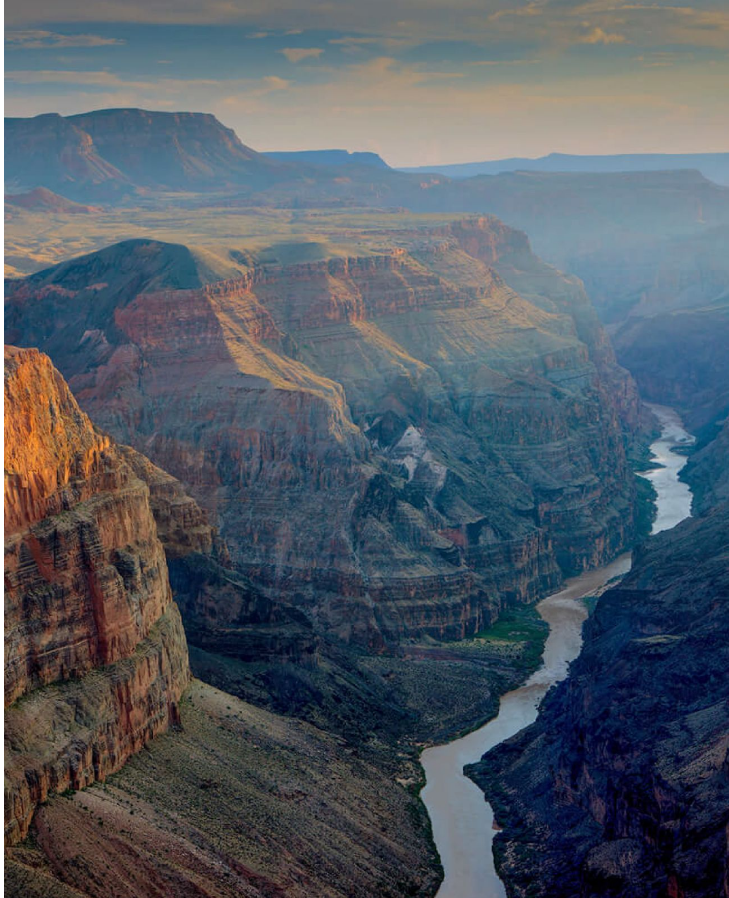




We've been investigating erosion. Now let's think about erosion and stability.



This environment looks **stable**, but has this environment always looked this way?



How much will this
canyon appear to **change**
in 50,000 years? What
might change?

Activity 2

Evidence Circles



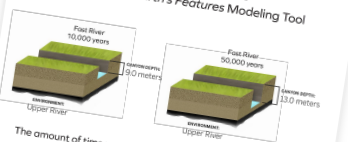
The park director sent us some **data** about the canyons. As geologists, we will use this data and the ideas we have been learning to make an **argument** about Desert Rocks Canyon.

Evidence Card 1
Data from Desert Rocks National Park

	Desert Rocks Canyon	Keller's Canyon
Speed of river	4 km/h	1 km/h

Card 1: Evidence Card 1 Data Set 1
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Evidence Card 2
Idea from the Earth's Features Modeling Tool



The amount of time water flows affect how much rock it erodes.

Card 2: Evidence Card 2 Data Set 1
© 2018 The Regents of the University of California

Evidence Card 3
Idea from Rocky Wonders



Rock can be broken down and eroded by things in the environment, such as moving water.

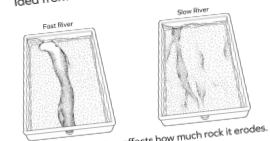
Card 3: Evidence Card 3 Data Set 1
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Evidence Card 4
Data from Desert Rocks National Park

	Desert Rocks Canyon	Keller's Canyon
Time river has been flowing	2 million years	1 million years

Card 4: Evidence Card 4 Data Set 1
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Evidence Card 5
Idea from Erosion Model Investigations



The speed of water flow affects how much rock it erodes.

Card 5: Evidence Card 5 Data Set 1
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Name: _____ Date: _____

Evidence Circles: Desert Rocks Canyon and Keller's Canyon

1. Read the question below.
2. Read each Evidence Card carefully. (You may want to take turns reading the cards aloud with your group.)
3. Talk about the evidence. Try to connect related data and ideas together.
4. With your group, make a claim that is supported by the evidence. Record the claim below.
5. If there is no agreement on a claim, discuss reasons your group still disagrees.

Question: Why did more rock layers get exposed in Desert Rocks Canyon than in Keller's Canyon?

Claim:

Turn to page 80 in your notebooks.

You will be discussing
our **Chapter 4 Question**
in your Evidence Circles.

Name: _____ Date: _____

Scientific Language for Evidence Circles**Ways to share ideas:**

- I think _____ because _____.
- The evidence shows that _____.
- This idea is important because _____.

Ways to respond to others:

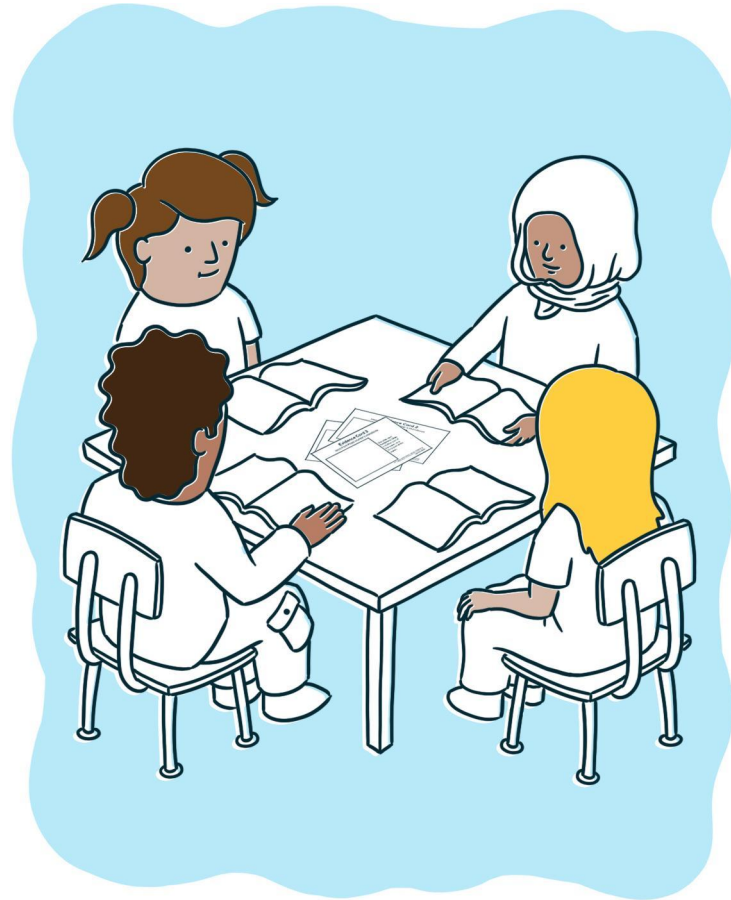
- I agree because _____.
- I disagree because _____.

Questions to ask during the discussion:

- What evidence supports the claim?
- Can you say more about why the evidence you shared supports the claim?

Turn to page 81 in your notebooks.

You can use this
scientific language to
help you discuss.



Review the evidence and
**begin your
Evidence Circles.**

Activity 3

Writing an Argument: Erosion in Two Canyons



What Is a Scientific Argument?

1. It answers a question with a claim about the natural world.
2. It includes evidence to support the claim. Evidence can be data and ideas.
3. It connects the evidence to the claim by linking different pieces of evidence together to show how they support the claim.
4. It uses scientific language.
5. It is written for an audience.

Name: _____ Date: _____

End-of-Unit Writing Part 2: Arguing About Why More Rock Layers Were Exposed in Desert Rocks Canyon

1. Write a scientific argument that answers the question below.
2. Your audience is the park director of Desert Rocks National Park.

Question: Why did more rock layers get exposed in Desert Rocks Canyon than in Keller's Canyon?

[illegible]

Write your argument to the park director.

End of Lesson



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There are 2 versions of the assessment

Version B

Name: _____ Date: _____

End-of-Unit Writing Part 2: Arguing About Why More Rock Layers Were Exposed in Desert Rocks Canyon

1. Write a scientific argument that answers the question below.
2. Your argument should include:
 - a claim that answers the question.
 - data and ideas that support the claim.
 - scientific language to connect data and ideas together to support the claim.
3. Your audience is the park director at Desert Rocks National Park.

Question: Why did more rock layers get exposed in Desert Rocks Canyon than in Keller's Canyon?

More rock layers got exposed in Desert Rocks Canyon than in Keller's Canyon because _____

The data show that _____

I know that _____

I also know _____

Earth's Features—Lesson 4.5 (Version B)

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1

Locate End of Unit Assessment

Classroom Slides are now available for this lesson!
Find them in the [Digital Resources](#) below.

Lesson 4.5: Students' Arguments

<

Lesson Brief (5 Activities)

- 1 STUDENT-TO-STUDENT DISCUSSION Stability and Change
- 2 STUDENT-TO-STUDENT DISCUSSION Evidence Circles
- 3 WRITING Writing an Argument: Erosion in Two Canyons
- 4 TEACHER-LED DISCUSSION Finding Patterns on Maps
- 5 TEACHER-LED DISCUSSION Concluding the Unit

RESET LESSON

Overview
Materials & Preparation
Differentiation
Standards
Vocabulary
Unplugged?

Overview

Note: The suggested time for this lesson is 80 minutes.

In this lesson, students engage in argumentation in small groups and write an argument to show their understanding of Chapter 4 content. Students first use the Think-Pair-Share discourse routine to discuss the crosscutting concept of Stability and Change and think about how this concept applies to erosion of a canyon. Then, students get new data about Desert Rocks Canyon and Keller's Canyon from the park director of Desert Rocks National Park. Students meet in Evidence Circles to discuss new data and how it connects with ideas they have been learning about erosion. Students make an evidence-based claim to answer the question *Why did more rock layers get exposed in Desert Rocks Canyon than in Keller's Canyon?* After a brief whole-class discussion, students write a scientific argument in response to the question. Next, students broaden their view, observing a world map to better understand patterns in Earth's features. Finally, at the end of the lesson, students conclude the unit by returning to the Rocks and Fossils anticipatory chart to reflect on all they have learned. The purpose of this lesson is for students to engage in argumentation as they apply their understanding of erosion.

Unit Anchor Phenomenon: The rock layers in Desert Rocks Canyon are exposed.

GENERATE PRINTABLE LESSON GUIDE

Digital Resources

- Classroom Slides 4.5 | PowerPoint
- Classroom Slides 4.5 | Google Slides
- All Projections
- Assessment Guide: Assessing Students' End-of-Unit Part 2 Arguments About Why More Rock Layers Were Exposed in Desert Rocks Canyon
- End-of-Unit Writing Part 2: Arguing About Why More Rock Layers Were Exposed in Desert Rocks Canyon Version A copymaster
- Optional: End-of-Unit Writing Part 2: Arguing About Why More Rock Layers Were Exposed in Desert Rocks Canyon Version B copymaster
- Patterns on a World Map copymaster
- Dynamic Planet Map
- Earth's Features Investigation Notebook, pages 79–82

Digital Resources

Classroom Slides 4.5 | PowerPoint

Classroom Slides 4.5 | Google Slides

All Projections

Assessment Guide: Assessing Students' End-of-Unit Part 2 Arguments About Why More Rock Layers Were Exposed in Desert Rocks Canyon

End-of-Unit Writing Part 2: Arguing About Why More Rock Layers Were Exposed in Desert Rocks Canyon Version A copymaster

Optional: End-of-Unit Writing Part 2: Arguing About Why More Rock Layers Were Exposed in Desert Rocks Canyon Version B copymaster

Patterns on a World Map copymaster

Dynamic Planet Map

Earth's Features Investigation Notebook, pages 79–82

End-of-Unit Assessment

Work time

Open and read your End-of-Unit Assessment Guide for lesson 4.5

Assessment Guide: Interpreting Students' Pre-Unit Explanations About the Rocky Outcrop

This pre-unit writing assessment is an opportunity for students to articulate their initial ideas about how fossils and rocks form and how they can be used to interpret the geologic history of a place. It also provides a baseline for considering student growth over the course of the unit. See the 3-D Assessment Objectives (under Printable Resources) for a summary of how summative and formative assessments across the unit, grade and grade band reveal student knowledge and use of the three dimensions to support progress toward the focal Performance Expectations for this unit.

This pre-unit assessment provides students with an opportunity to connect their background knowledge and the initial ideas they have to the concepts they will be learning about in the *Earth's Features: Mystery in Desert Rocks Canyon* unit. It can also provide insight into students' thinking as you begin this unit of instruction. This will allow you to draw connections to students' experiences and to watch for alternate conceptions that might get in the way of students' understanding. In particular, look for the following:

Connecting to students' experiences. Examples of students' experiences they might reference that you can connect to the content of lessons in the unit include the following:

- seeing fossils exhibited in a natural history museum
- hiking or visiting a national park
- seeing rocks in a river or other moving water

Building on prior knowledge. Examples of ideas that students can build on throughout the unit include the following:

- Fossils are evidence of life from the past.
- Things can build up over time.
- Rock material can be different sizes, such as boulders, pebbles, or sand.

Applying crosscutting concepts. Example of ways students could demonstrate facility with the crosscutting concept of Stability and Change:

- The environment of Desert Rocks National Park could have been different in the past (applying the idea that *some systems appear stable, but can change over long periods of time*).

Gauging students' facility with science practices. Since students write a scientific explanation for this task, it offers an entry-level assessment of student facility with this science and engineering practice. However, because students' work in response to this pre-assessment may be sparse and the unit is focused on the science and engineering practice of Engaging in Argument from Evidence, we recommend using students' first independently written arguments, and corresponding assessment guidance in Lesson 2.6 (Assessment Guide: Reviewing Students' Chapter 2 Arguments About the Environment When the Upper Layer Formed) as an entry-level assessment of this science and engineering practice. Additional entry-level assessments of science and engineering practices and

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crosscutting concepts can be found in the following lessons: the science and engineering practice of Obtaining, Evaluating, and Communicating Information in Lesson 1.2 (On-the-Fly Assessment 1, Activity 4), and the crosscutting concept of Stability and Change in Lesson 2.4 (On-the-Fly Assessment 7, Activity 4).

Preconceptions, contrasted with accepted scientific understandings include the following:

- **Rock doesn't change.** Because geologic processes take so long, many students might not think that rocks ever change. However, rock on Earth is constantly changing: new rocks form and old rocks break down. Most rock transformation processes happen at times scales too long for humans to experience.
- **The environment in one place doesn't change.** Similar to rocks, environments change slowly over time, and students might not understand that one place can transition from an underwater environment to being exposed to air. However, because of sea transgressions and regressions, as well as sedimentary infilling of basins and tectonic activity, the environment in one location can change over geologic time.
- **Water or wind can't affect rock.** Rock is a very solid, while water and wind are not thought of as very strong or powerful. However, moving water or wind can move small pieces of sediment, which creates friction with existing rock and can wear the rock down over time.
- **All fossils are the same age, which is very old.** Students might think of any fossil as representing "the past," without considering Earth's nearly four-billion-year-old history of life and the range of relative ages for fossils. In fact, one fossil can be hundreds of millions of years older than another fossil, and fossils range from billions of years old to just 10,000 years old.
- **Life has always been as it is.** Some students might think that all the species that are alive now have always been alive, or that species have never gone extinct. However, new species evolve and existing species go extinct regularly over time.

The assessment task in this lesson provides an opportunity to formatively assess students' preliminary understanding of the following standards:

Science and Engineering Practice

- Practice 6: Constructing Explanations and Designing Solutions

Disciplinary Core Idea

- ESS1.C: The History of Planet Earth:
 - Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (4-ESS1-1)

Crosscutting Concept

- Stability and Change

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2

Questions?





Plan for the day: Part 1

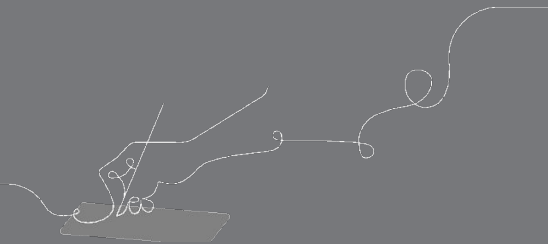
- Introduction and Framing
- Unit Internalization
- Formative Assessments
- Closing

Overarching goals

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

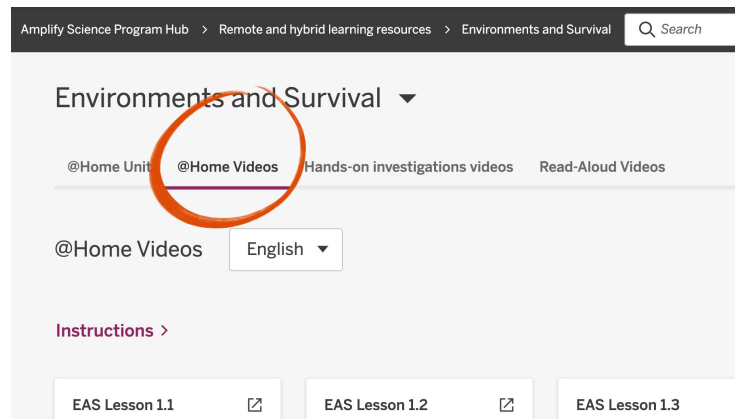
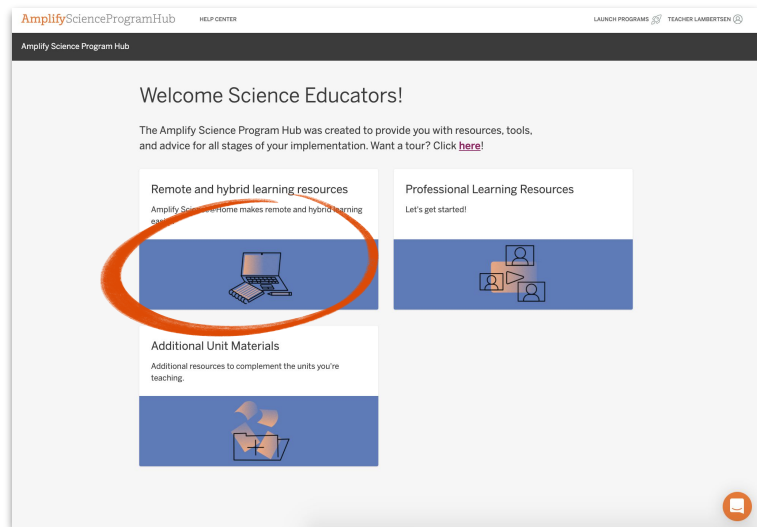
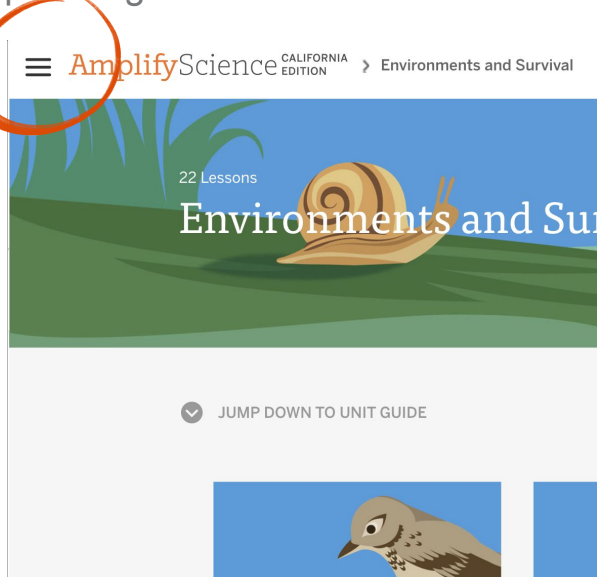
- ❑ Understand the pre and post assessments in this unit.
- ❑ Understand how the formative assessments build to the summative assessment.

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Program Hub

Use the Amplify Science Program Hub to find useful resources for implementing Amplify Science, including unit overview videos and planning tools.



LAUSD Microsite-
<https://amplify.com/lausd-science>



Welcome to Amplify Science!

This site contains supporting resources designed for the LAUSD Amplify Science adoption for grades TK–8.

- Access the [Amplify Science Program Hub](#) (To help orient you to the new design, watch this [video](#) and view this [reference guide](#).)
- Find out more about [Amplify Science@Home](#)
- Share the [Caregiver Hub](#) (Eng/Span) with your families
- For LAUSD ES Teachers- [Amplify Science & Benchmark Advance Crosswalk](#)
- Instructional guidance for a [Responsive Relaunch of Amplify Science in 21-22](#)

Click the button below to preview the digital Teacher's Guide, and check back for exciting updates to this site!

Additional resources and ongoing support

Customer Care

Seek information specific to enrollment and rosters, technical support, materials and kits, and teaching support, weekdays 7AM-10PM EST and weekends 10AM-6PM EST.



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End of Part 2