

Amplify Science

Writing in Science

Grade 4, Unit 3: Earth's Features

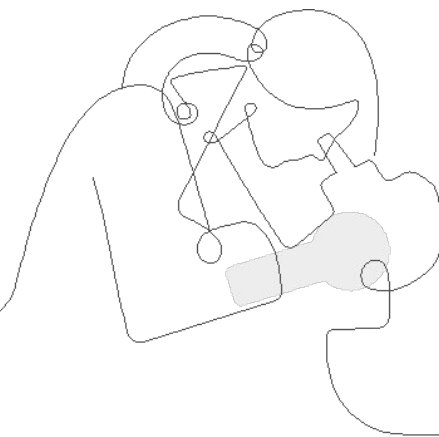
Part 3

Strengthen workshop

School/District Name

Date

Presented by Your Name



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


Why do scientists write?



Norms: Establishing a culture of learners

- **Take risks:** Ask any questions, provide any answers.
- **Participate:** Share your thinking, participate in discussion and reflection.
- **Be fully present:** Unplug and immerse yourself in the moment.
- **Physical needs:** Stand up, get water, take breaks.

Schoolology



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LMS App Center

The LMS App Center provides a catalog of District-approved digital content and learning tools (including digital components of adopted textbooks) that are available for classroom teachers and students to access within the learning management system, Schoolology.

For information on District-approval policies and procedures, please visit: [udidp.lausd.net](#).

- To search the full list of digital learning tools, click "Submit".
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To learn more about using the LMS App Center, please refer to the following video overview.

Publisher Name: Starts With

Content Area: All

Grade Level: All

Content Type: All

Textbook Title: Starts With

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All Amplify Products



LMS App Center

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To learn more about using the LMS App Center, please refer to the following video overview.

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Amplify

Content Area: ELA
 Grade Level: ES
 Content Type: Supplemental
 Integration Type: App (Left Navigation)
 Purchase Type: District and School
[Getting Started Guide](#)
 Other Info: School licenses required
 mCLASS
 CKLA
 Amplify Reading
 Amplify Science
 Amplify Math

Vendor Support Desk:
 P: 800.823.9969
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 S: amplify.com/support/
Textbook Title(s):
 NA

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Schoology

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



Navigation Temperature Check

Rate yourself on your comfort level accessing Amplify Science materials and navigating a digital curriculum.

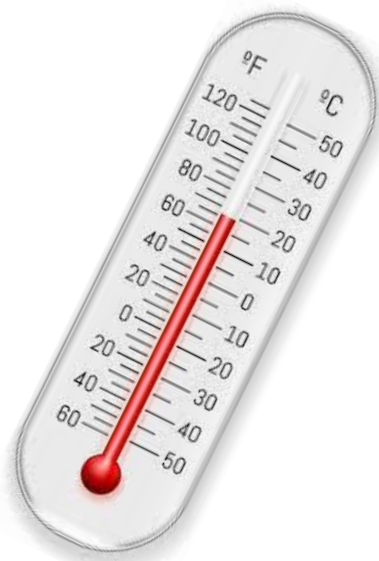
1 = Extremely Uncomfortable

2 = Uncomfortable

3 = Mild

4 = Comfortable

5 = Extremely Comfortable



Overarching goals

- ❑ Identify specific characteristics and genres unique to science writing
- ❑ Describe how the Amplify Science writing approach supports students to engage in science practices, make sense of science ideas, and develop as writers
- ❑ Be ready to teach specific writing activities in an Amplify Science unit

**Let's connect
this goal to
our students**





Plan for the day

- Introduction and framing
- Writing in Amplify Science
 - Writing as part of a multimodal experience
 - Supporting students with writing
 - Writing a culminating explanation or argument
 - Additional supports
- Model Lesson
- Planning
- Closing

Opening Reflection

What are your goals
for student outcomes?



Participant Notebook

<https://bit.ly/3JliYhU>

Reflection

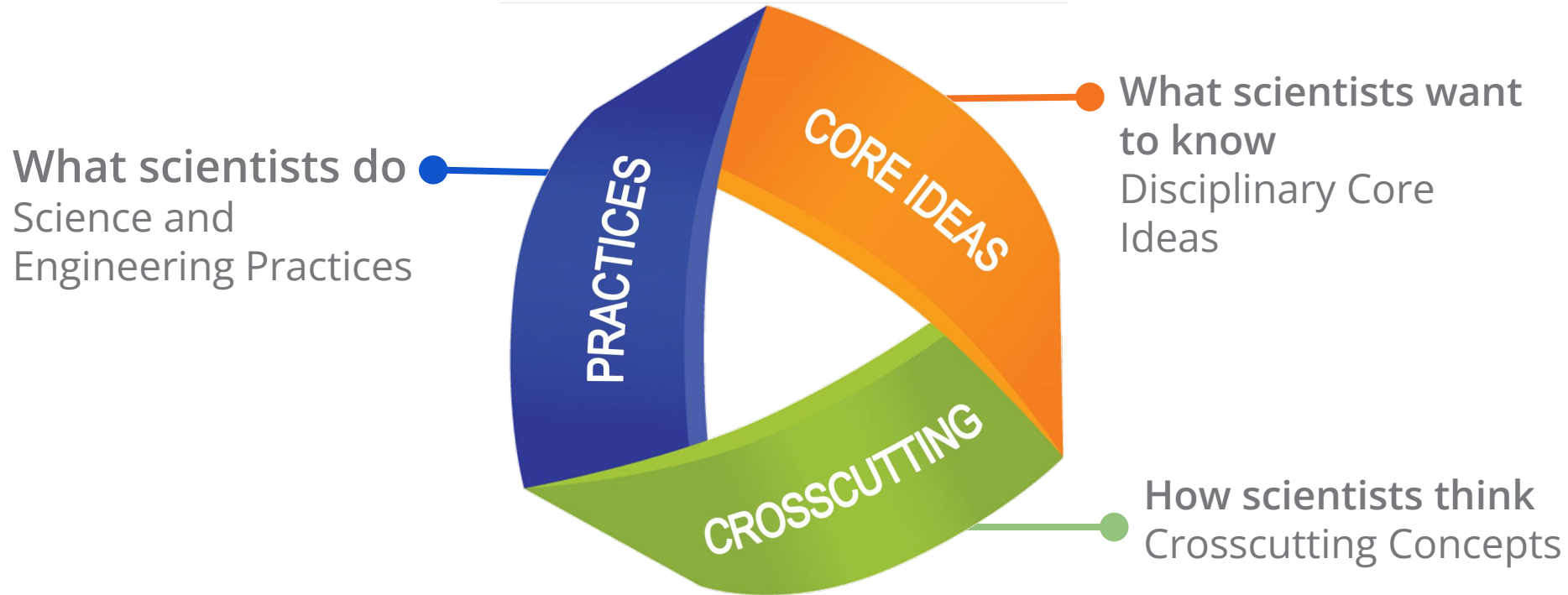
Use the provided spaces as a place for reflection throughout the session.

Session goals and student outcomes

What Connect the workshop goal(s) to an outcome you envision for your students.	Why Reflect on why you want this outcome for your students.	How How will your students achieve the outcome? Reflect on what you learned during the workshop that will impact student outcomes.

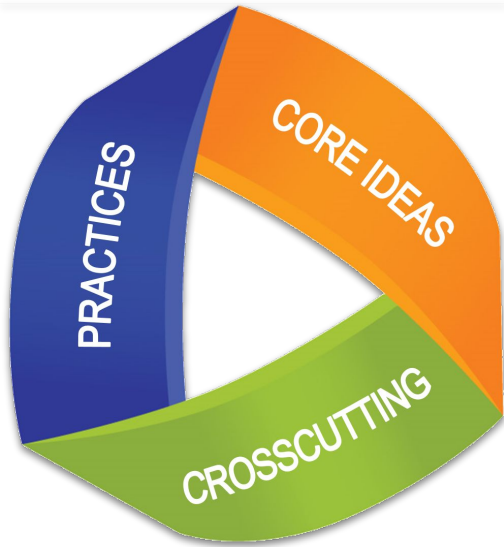
Figuring out phenomena

Using 3-D teaching and learning



Next Generation Science Standards

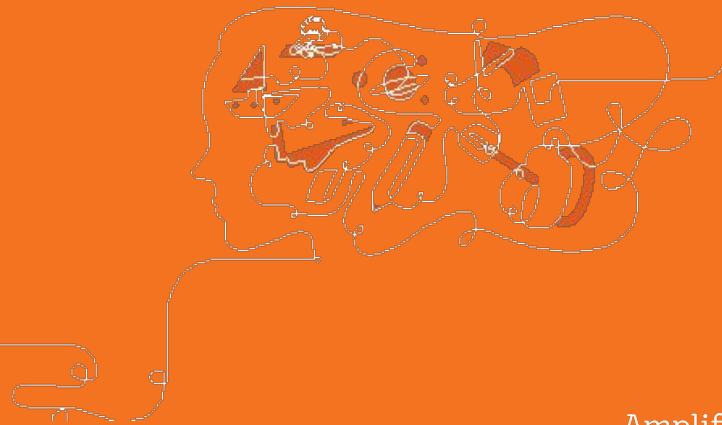
Science and Engineering Practices



1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

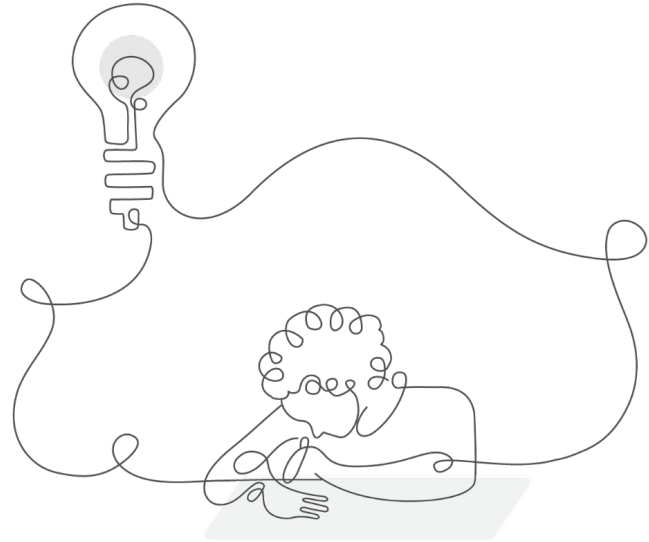
Writing in Amplify Science

Purposeful communicative writing is an integral part of the Amplify Science curriculum

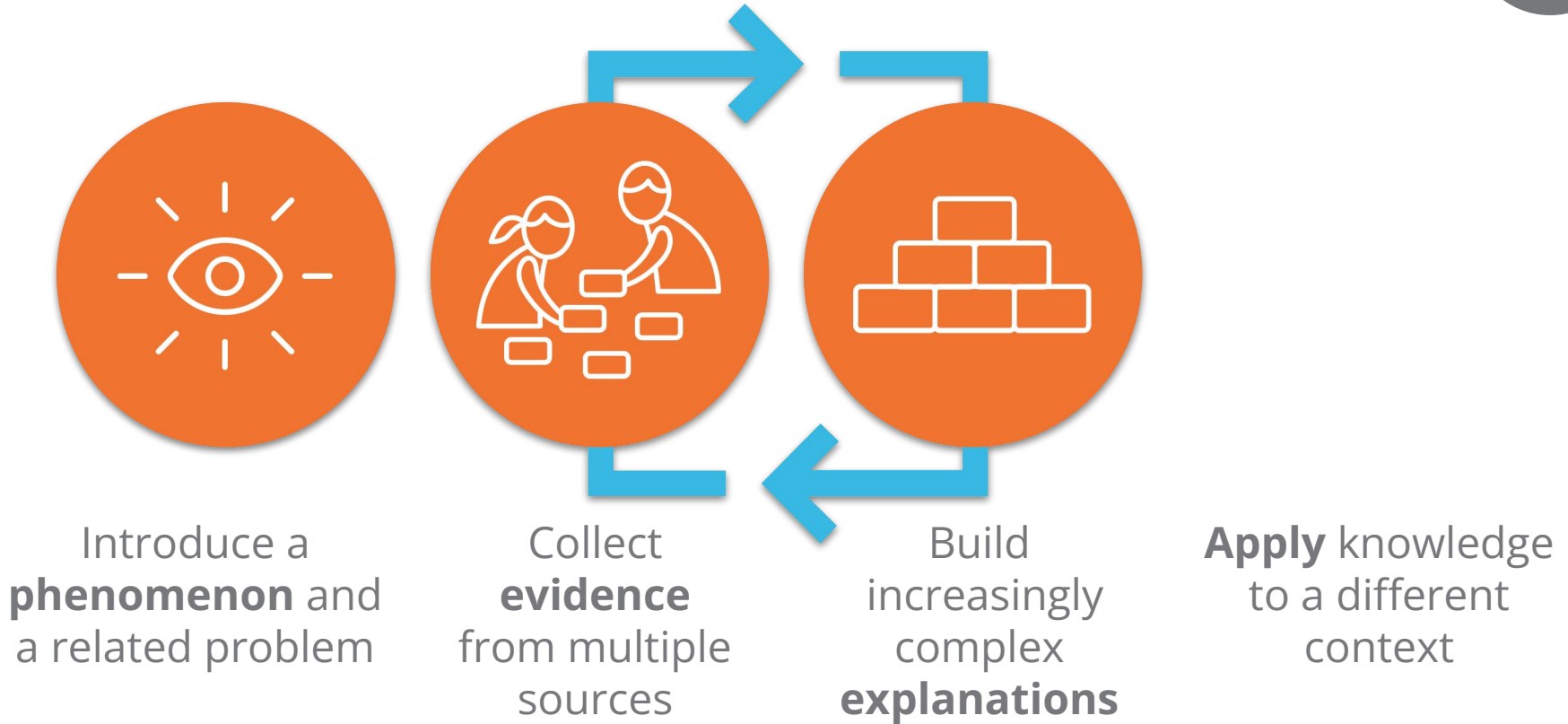


Why do students write in Amplify Science?

- To activate background knowledge
- To reflect on understanding
- To engage in sense-making
- To record data / observations
- To organize ideas
- To communicate ideas
 - To explain
 - To persuade



Instructional approach



Phenomena-based Instruction

Inquire like a scientist.

Think like a scientist.

Quantify like a scientist.

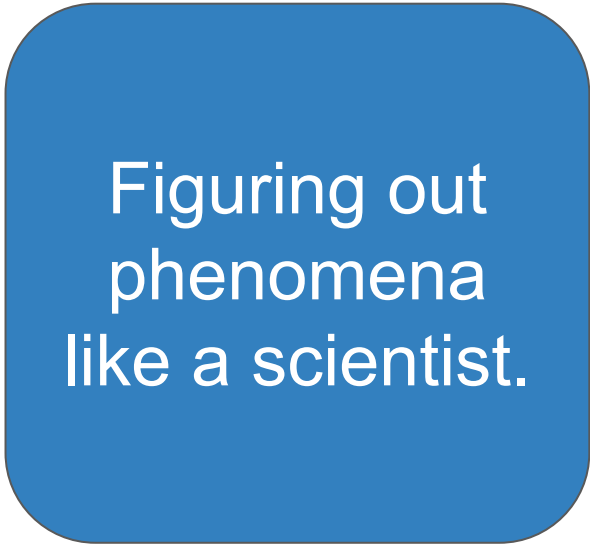
Read like a scientist.

Talk like a scientist.

✓ **Write** like a scientist.

Critique like a scientist.

Argue like a scientist.



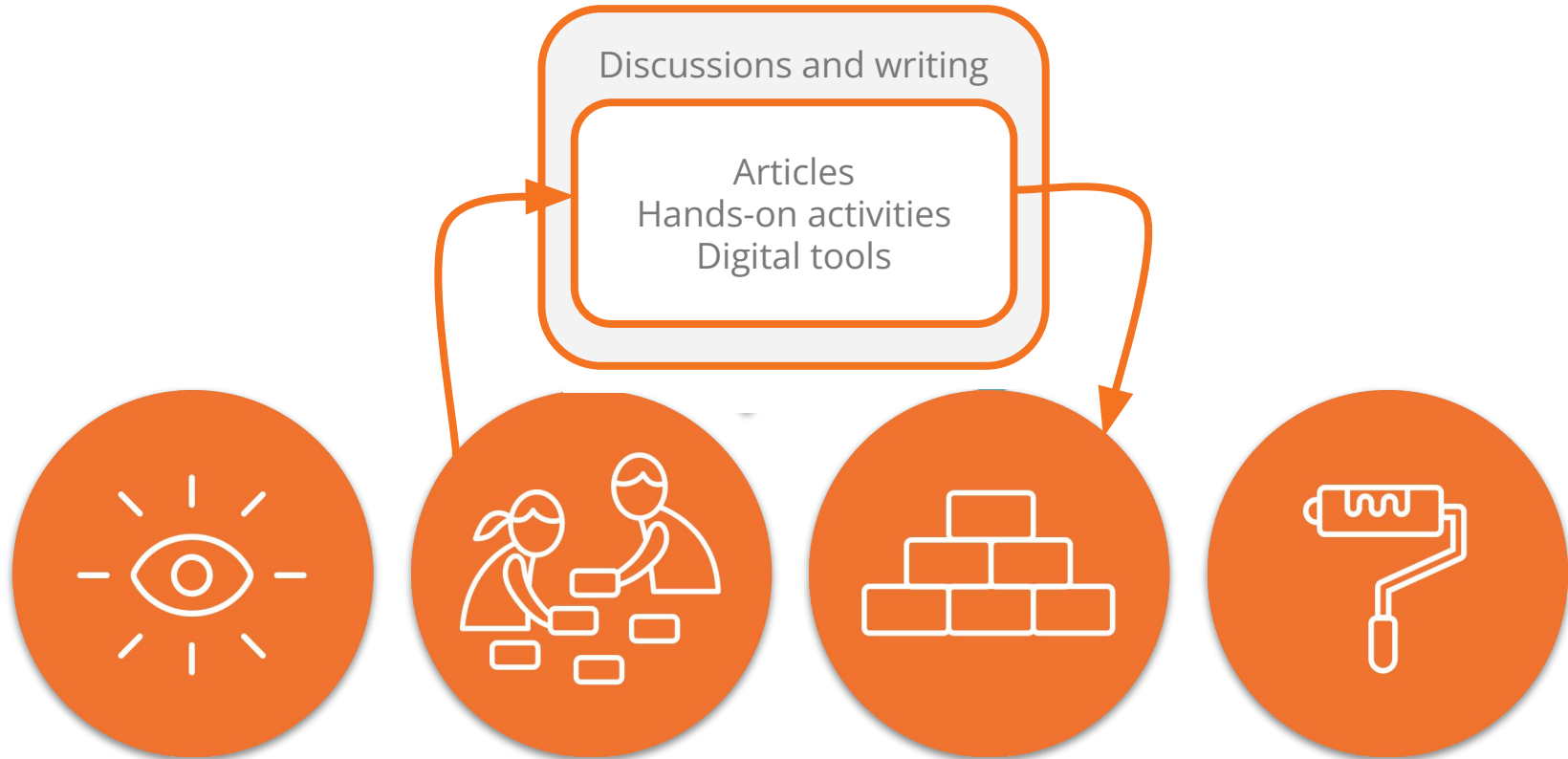
Figuring out
phenomena
like a scientist.

Why do students write in Amplify Science?

- To activate background knowledge
- To reflect on understanding
- To engage in sense-making
- To record data / observations
- To organize ideas
- To communicate ideas
 - Explain
 - Persuade



Instructional approach





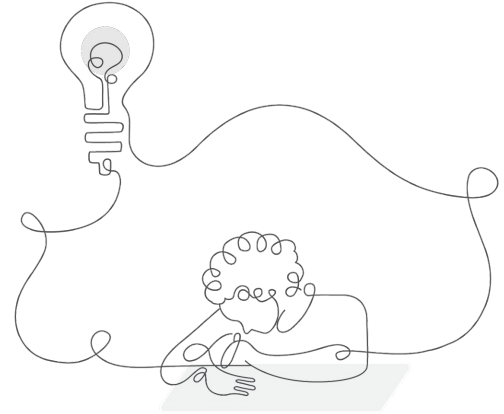
Plan for the day

- Introduction and framing
- **Writing in Amplify Science**
 - **Writing as part of a multimodal experience**
 - Supporting students with writing
 - Writing a culminating explanation or argument
 - Additional supports
- Model Lesson
- Planning
- Closing

Reviewing the unit phenomenon

Amplify Science units are designed around complex phenomena that drives student learning through the unit.

Pay attention to the phenomenon, or observable event, students will figure out in your unit.



Earth's Features



Problem: Students investigate how a dinosaur fossil in the fictional Desert Rocks National Park formed

Role: Geologists

Students figure out what the environment of the park was like in the past and why it has so many visible rock layers.

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.



1 ?

We already have our first **two clues**: the fossil and the rocky outcrop where the fossil was found.

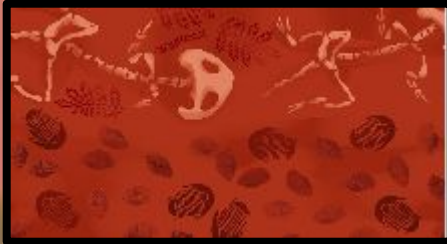


This unit will focus on **fossils** and the **rock** in which they form.

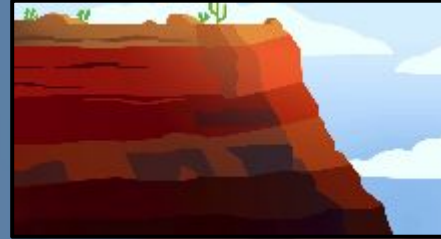
We will be studying fossils and rock as **geologists**.

Earth's Features

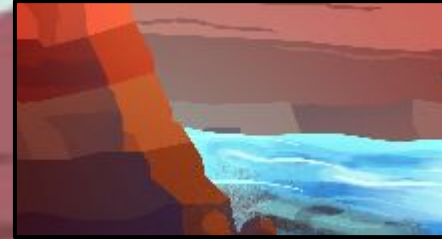
Coherent Storylines



The environment was a floodplain when the lower rock layer formed and a deep ocean when the upper rock layer formed



The siltstone layer is below the mudstone layer, which is below the shale layer.



More rock layers got exposed in Desert Rocks Canyon because its river is faster and has been there longer than the river in Keller's Canyon.



A fossil is the preserved remains of an organism that lived a long time ago. They form when the organism dies, and sediments sink through the water to completely cover its body.

Sample instructional sequence

Grade 4 Earth's Features

During the sample sequence, we'll experience some **small writes**.

Small writes are **short writing opportunities**. They're distinct from more formal end-of-chapter explanations or arguments (which we'll talk about later).



Sample instructional sequence

Grade 4 Earth's Features

As you experience the small writes in the sequence, consider the **role** of each writing opportunity.

It may help to consider:

- Why are students writing?
- How is it useful to them in figuring out the phenomenon?



Sample instructional sequence

Note catcher

Use **Table 1** to keep track of your thinking during the instructional sequence.

Writing in science: Note catcher and reference sheet

Table 1: Writing as part of the multimodal experience

Reference: Why do students write in Amplify Science?

- To activate background knowledge
- To reflect on understanding
- To engage in sense-making
- To record data / observations
- To organize ideas
- To communicate ideas
 - To explain
 - To persuade

Sample instructional sequence: Use the space below to make notes about the role of each small write as we talk through the sequence

Small write 1: *Blue Whales and Buttercups*

Small write 2: Recording and analyzing observations

Small write 3: Gathering evidence about the Elk Mountain Pack

End-of-sequence reflection: How did the small writes support students as they worked towards writing the more formal end-of-chapter explanation?

Reference: Embedded supports for writing in Amplify Science

- Smaller pieces of writing build to larger pieces of writing
- Informal talk opportunities: partners and small groups
- Sentence starters and/or language frames
- Classroom wall and other environmental print
- Word banks
- Discourse routines
- Multimodal instruction
- Gradual release of responsibility

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1

in your unit

is upcoming. Review the activity and small write to analyze.

nt Guide from digital resources.

Reflection: How could the End-of-Unit Assessment Guide help your planning and instruction throughout the whole unit?

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2

Earth's Features: Writing in Chapter 1

Chapters

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



LESSON 1.1
Pre-Unit Assessment



LESSON 1.2
Clues from the Past



LESSON 1.3
Fossil Formation



LESSON 1.4
Sedimentary Rock
Formation



LESSON 1.5
Modeling Sedimentary
Rock Formation



LESSON 1.6
Writing a Scientific
Argument



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





This is Desert Rocks Canyon, one of the many canyons in the park. A **canyon** is a **valley with steep sides** made of rock.



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.



This big section of rock where the fossil was found is called a **rocky outcrop**. A rocky outcrop is a section of exposed rock.



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



1 ?

We already have our first **two clues**: the fossil and the rocky outcrop where the fossil was found.

Vocabulary



geologist

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



Unit Question

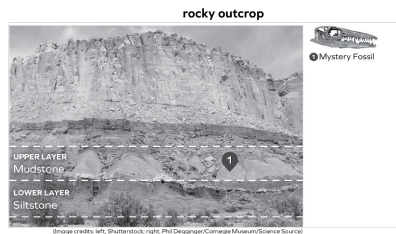
How do rocks and fossils tell us about the way Earth changes over time?

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.

**Part 1**

How did this rock with the fossil in it form?

Earth's Features—Lesson 1.1

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Earth's Features—Lesson 1.1

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Earth's Features—Lesson 1.1

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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.

Small write 1: Record observations

Name: _____ Date: _____

Exploring the *Earth's Features* Simulation

1. With your partner, explore the *Earth's Features* Simulation. Observe carefully how the rock layers in the Sim can change.
2. Talk about the discussion questions with your partner as you explore the Sim.
3. After you have finished exploring the Sim, record your response to the question on the lines below.

Discussion Questions

- What happens when you move time forward?
- How are the three locations different from one another?
- When you change the sea level, what do you observe happening?

What new questions or ideas do you have about rocks and fossils?

Turn to page 3 in your notebooks.

You will now have a
chance to explore
the Simulation.

Earth's Features: Writing in Chapter 1

Chapters

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



LESSON 1.1
Pre-Unit Assessment



LESSON 1.2
Clues from the Past



LESSON 1.3
Fossil Formation



LESSON 1.4
Sedimentary Rock
Formation



LESSON 1.5
Modeling Sedimentary
Rock Formation



LESSON 1.6
Writing a Scientific
Argument

Vocabulary



observation

something you notice using any of the five senses

Vocabulary



inference

something you figure out based on observations
and information you already know



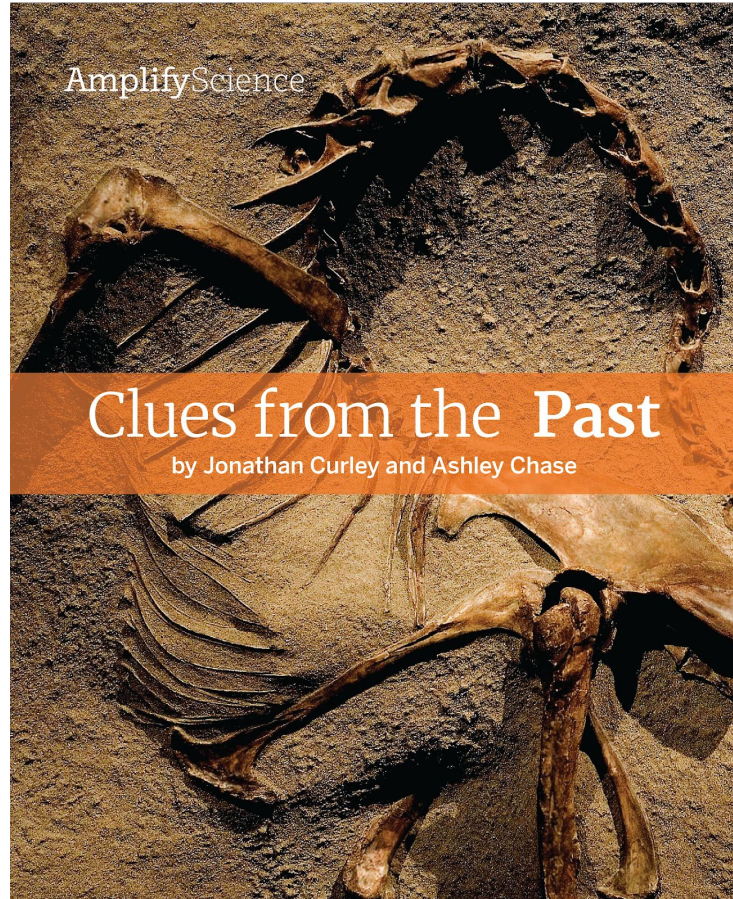
Geologists **observe clues**, like fossils and rocks, and use ideas about science they already know to **make inferences** about what might have happened in a place in the past.

Vocabulary



fossil

a clue about life from the past that is preserved in rock



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

Small write 2: Record observations and engage in sense making

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:	

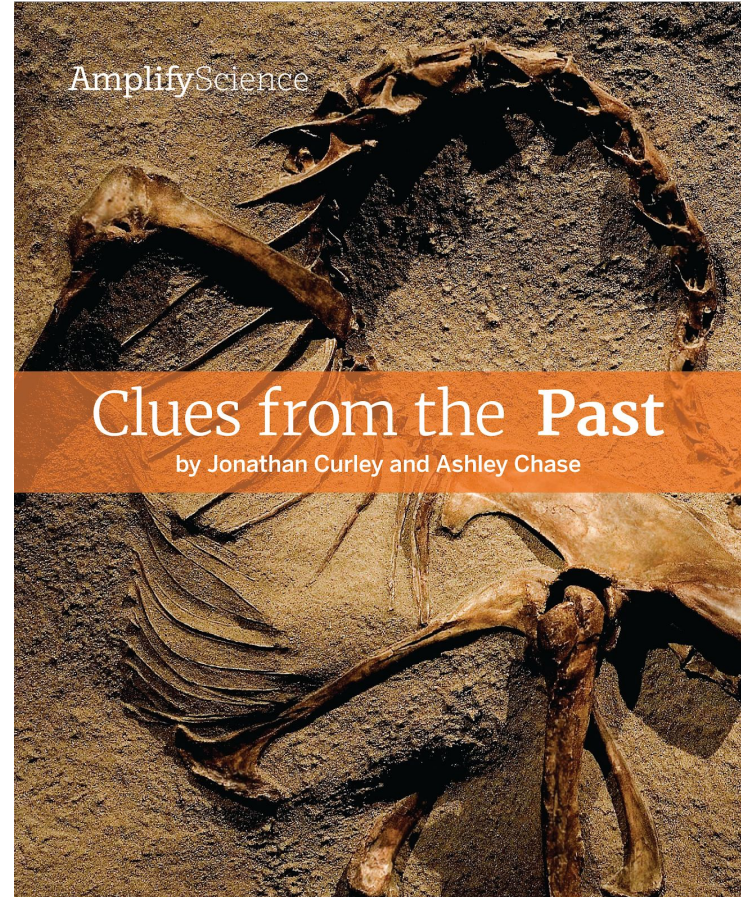
Turn to page 5 in your notebooks.

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

Reflecting on small write 2

Recording observations and inferences is a small writing opportunity.

What are your ideas about the **purpose and role of writing** in this small write activity?



Earth's Features: Writing in Chapter 1

Chapters

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



LESSON 1.1
Pre-Unit Assessment



LESSON 1.2
Clues from the Past



LESSON 1.3
Fossil Formation



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LESSON 1.5
Modeling Sedimentary
Rock Formation



LESSON 1.6
Writing a Scientific
Argument

Small write 3: Record observations

Name: _____ Date: _____

How a Fossil Forms

1. Using the *Earth's Features* Simulation, work with your partner to observe how a fossil forms.
2. Press ADD ORGANISMS.
3. Move time forward until a fossil forms.
4. Answer the questions below based on what you observed in the Sim.

How do you think fossils form?

Can you find an environment in the Sim where a fossil does not form? What did you observe about that environment?

Turn to page 9 in your notebooks.

We will investigate
fossils in the Simulation.



You will use what you have learned about **fossil formation** to explain how this fossil may have formed.

Small write 4: Reflecting on understanding

Name: _____ Date: _____

Reflective Writing: Fossils

Record a response to the question below. Think about the information you gathered from the Sim and *Clues from the Past* to help you answer the question.



How do you think this fossil formed?

Turn to page 10 in your notebooks.



Record your answer to the question on your notebook page.

Earth's Features: Writing in Chapter 1

Chapters

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



LESSON 1.1
Pre-Unit Assessment



LESSON 1.2
Clues from the Past



LESSON 1.3
Fossil Formation



LESSON 1.4
Sedimentary Rock
Formation



LESSON 1.5
Modeling Sedimentary
Rock Formation



LESSON 1.6
Writing a Scientific
Argument

Activity 2

Observing Rocks





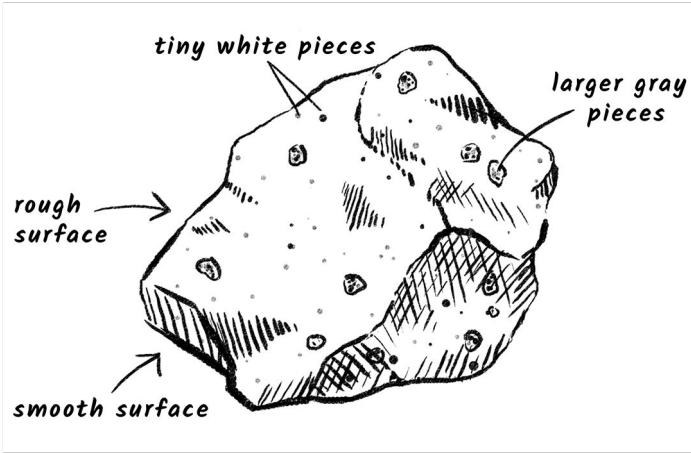
To start thinking about **how rocks form**, you will observe a rock sample with a partner and discuss what you observe.



Observe the rock sample and **discuss** your observations.

Geologists use **data**, such as written observations and drawings, to make **inferences** about rocks and fossils.

You will **record your observations** now and then use your data to **make inferences** about how this rock formed.



This is an example of a drawing a geologist would make.

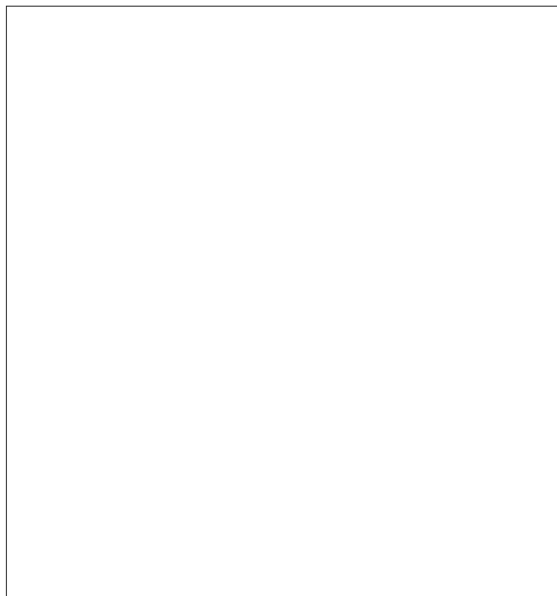
The drawing and labels show detail about **texture** and **color**.

Small write 5: Recording observations

Name: _____ Date: _____

Rock Observations

1. With a partner, observe your rock sample.
2. Draw your rock sample and label the details you observe.



Turn to page 12 in your notebooks.

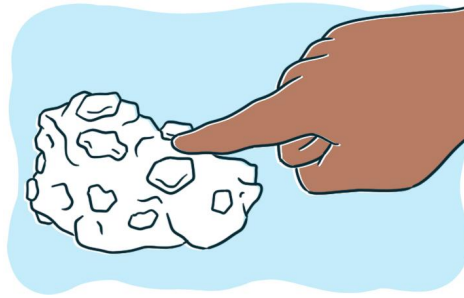
You will observe your rock sample and then **draw it** in the box and **label the details** of your drawing.

Observe Rock Sample



Step 1

Use the **hand lens** to **observe** the rock.
Take turns.



Touch the rock to **observe** how it feels.



Step 2

Use your observations to **make a drawing**. **Label** the details.



What did you observe about how the rock sample **looks** and **feels**?



When geologists observe sedimentary rock, one detail they observe is the **size of the sediment** that makes up the rock.



The rocks you observed are made of **larger** sediment like this gravel **mixed** with **smaller** sediment like sand.

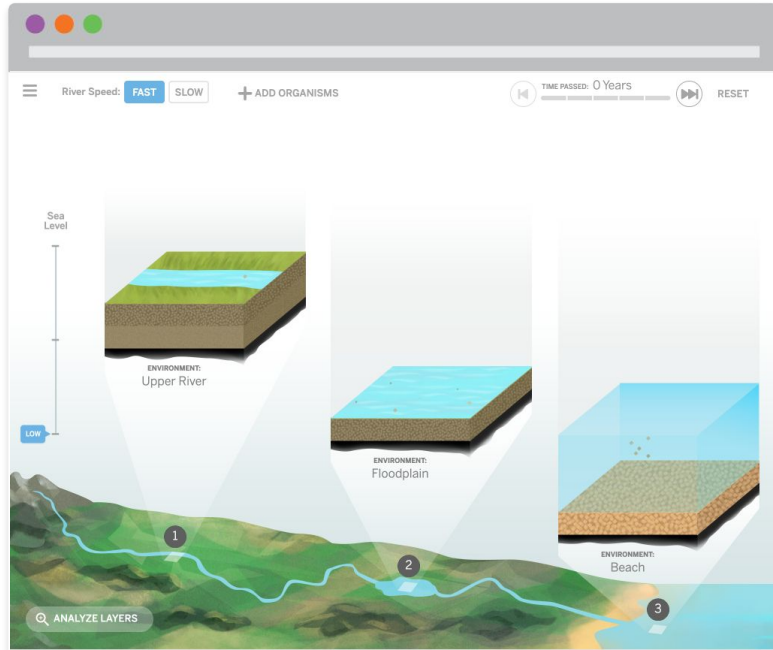


How do you think these
rocks could have formed
from **gravel and sand**?

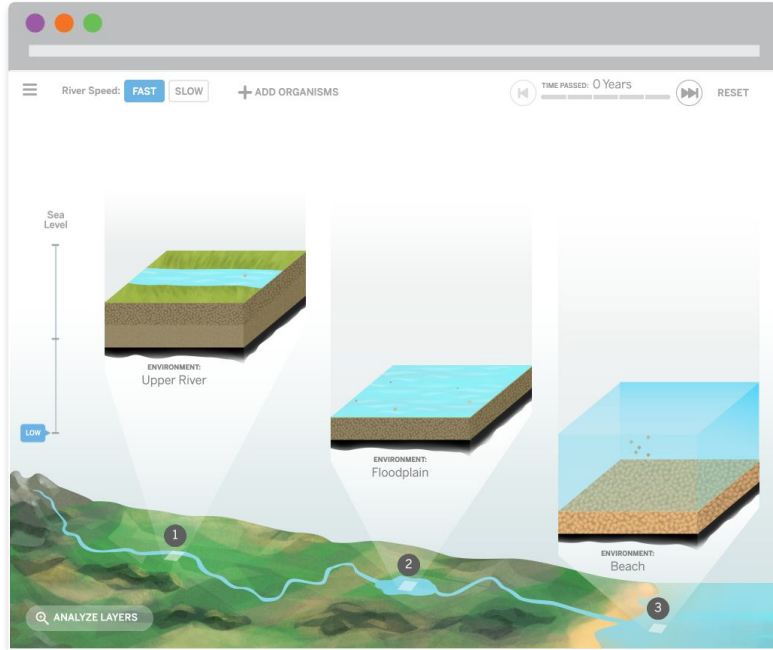
Activity 3

Rock Formation in the Simulation





We will use the *Earth's Features* Sim to gather information to help us answer this question:
How does sedimentary rock form?



Remember, the Sim is a model. **Scientists use models** like simulations **to investigate things** that they cannot observe happening in the real world.

Name: _____ Date: _____

Rock Formation in the Simulation

1. Use the *Earth's Features* Sim to observe how rocks form.
2. Without changing the sea level, move time forward to observe rock forming and how it forms.
3. Record your observations about how rocks form.

Observations of the Sim:

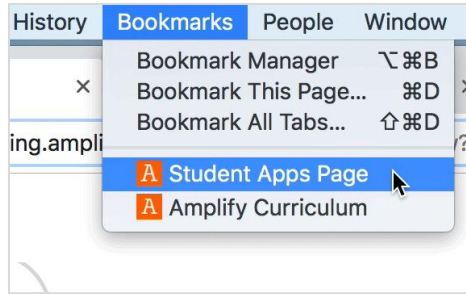
Make a drawing and label it if it helps you explain your thinking.



Turn to page 13 in your notebooks.

Let's review the instructions to learn how you will use the Sim to investigate how rock forms.

Access the Sim



Step 1

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



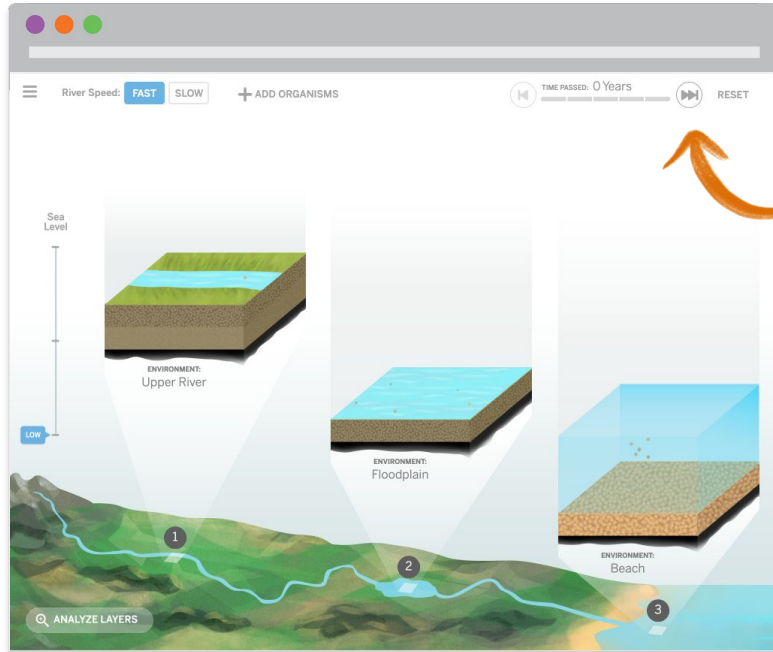
Step 2

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



Step 3

Click on the **orange box with a 1** to access the Sim.



Earth's Features Sim



Move time forward to observe rock forming and how it forms.



Do not change the sea level.



Make observations about how rock forms.

Small write 5: Rock formation in the simulation

}

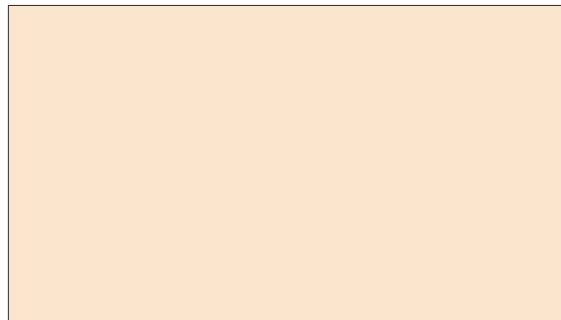
Name: _____ Date: _____

Rock Formation in the Simulation

1. Use the *Earth's Features* Sim to observe how rocks form.
2. Without changing the sea level, move time forward to observe rock forming and how it forms.
3. Record your observations about how rocks form.

Observations of the Sim:

Make a drawing and label it if it helps you explain your thinking.



Observe how rock forms in the Sim. Then, **record** your observations.

Remember, sediment is small pieces of rock.



What happened to the sediment **before** the rock formed?

Did you notice anything about **where** the rock formed and where it did not form?

Activity 4

Reflecting on How Rocks Formed





Now you will **use data from observations** of the rock sample and your ideas about rock formation from the Sim to **make an inference** about how the rock formed.

Small write 6: Making inferences on how rocks form

Name: _____ Date: _____

Making Inferences About How Rocks Form

1. Think back to the rock sample you observed at the beginning of class.
2. Connect your observations of the rock sample with what you learned from the Sim.
3. Use your observations and what you learned to make an inference about how the rock sample could have formed.
4. Write your inference on the lines below.



Turn to page 14 in your notebooks.



Record your inferences
about how the rock
formed.



How do you think the
rock you observed
formed?

Earth's Features: Writing in Chapter 1

Chapters

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



LESSON 1.1
Pre-Unit Assessment



LESSON 1.2
Clues from the Past



LESSON 1.3
Fossil Formation



LESSON 1.4
Sedimentary Rock
Formation



LESSON 1.5
Modeling Sedimentary
Rock Formation



LESSON 1.6
Writing a Scientific
Argument



Remember that we are investigating this question:

How does sedimentary rock form?



These fossils come from organisms that were trapped in sediment at the bottom of a shallow ocean. The sediment turned into sedimentary rock, and the organisms turned into fossils.

Fossils are usually found in a certain type of rock: **sedimentary rock**. To understand fossils, we need to look at how sedimentary rock forms from **sediment**. Sediment is made up of sand, mud, and tiny bits of rock. When organisms die, sometimes their bodies can become trapped in sediment.

Turn to page 6 in *Clues from the Past*.

Let's **reread** this section together.



1 ?

We are working as **geologists** to figure out how the fossil came to be in this canyon.

To do this, we are **investigating** how sedimentary rock forms.

You will make your own **models** of how **sedimentary rock** forms to help you investigate.

You will use the illustrations and the text in the book to figure out how this process happens.

Small write 7: Recording observations

Name: _____ Date: _____

How Does Sedimentary Rock Form?

1. Reread page 7 of *Clues from the Past*. In the first column of the table below, record how sedimentary rock forms.
2. In the second column, record ideas for how you could show this step in a model using the materials provided.

Steps for how sedimentary rock forms	How to use materials to make a model of each step
1.	
2.	
3.	
4.	
5.	
6.	

Turn to page 16 in your notebooks.

You will make a **list of the steps** in the process of sedimentary rock formation so you can show those same steps in your model.

Earth's Features: Writing in Chapter 1

Chapters

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



LESSON 1.1
Pre-Unit Assessment



LESSON 1.2
Clues from the Past



LESSON 1.3
Fossil Formation



LESSON 1.4
Sedimentary Rock
Formation



LESSON 1.5
Modeling Sedimentary
Rock Formation



LESSON 1.6
Writing a Scientific
Argument

Vocabulary



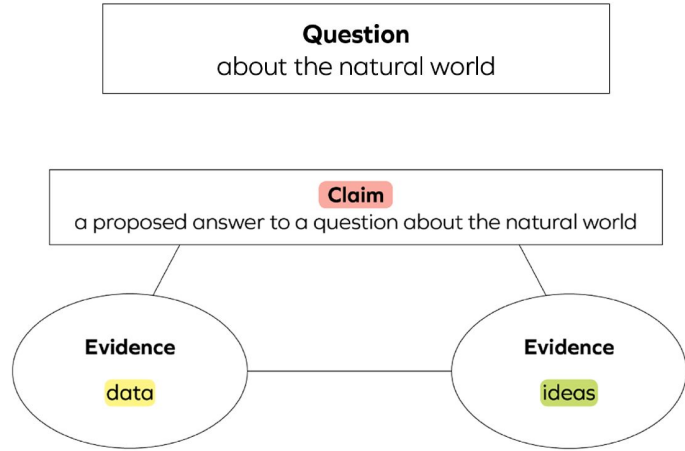
argument

the use of evidence to say why one idea is the best

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.

Scientific Argument



This diagram shows the elements of a **scientific argument**. Data and ideas together can be used as evidence to support a claim.

Let's look at an example.

What happened in this place? ← question

A bird hatched out of an egg. ← claim

I observed a nest. I know that birds make nests. I also observed a broken piece of eggshell in the nest. I know that birds lay eggs and when birds hatch they leave the broken shell behind. This means that a bird must have hatched out of an egg in this place.

]

evidence

Scientific Argument: Past Environment of Desert Rocks National Park

Question: What was the environment of Desert Rocks National Park like in the past?

Desert Rocks National Park used to be underwater.

Now we're going to use
the evidence you
discussed to **complete
this argument.**

Scientific Language for Writing Arguments

The data shows

I know

This means that

When scientists write arguments, they need to **organize their evidence** so it makes sense and is easy for someone reading it to understand how the data and ideas support the claim.

Scientific Argument: Past Environment of Desert Rocks National Park

Question: What was the environment of Desert Rocks National Park like in the past?

Desert Rocks National Park used to be underwater.



Let's construct our argument together.



What is the **data** we have from the rocky outcrop?

Scientific Argument: Past Environment of Desert Rocks National Park

Question: What was the environment of Desert Rocks National Park like in the past?

Desert Rocks National Park used to be underwater.



What do we know about
the **type of rock** that
fossils are found in?

Scientific Argument: Past Environment of Desert Rocks National Park

Question: What was the environment of Desert Rocks National Park like in the past?

Desert Rocks National Park used to be underwater.



Let's **add** a last sentence
to wrap up the argument.

Reflecting on the small writes

How did the short writing opportunities in this chapter support students as they worked towards writing the more formal end-of-chapter explanation?

Small Writes
Observation with the Sims
Record observations and inferences from <i>Clues from the Past</i>
Reading and Daily Written Reflections
Reflective writing and making inferences

What were the different types of writing in Chapter 1?



Small Writes

Observation with the Sims

Record observations and inferences from *Clues from the Past*

Reading and Daily Written Reflections

Reflective writing and making inferences

Writing across a chapter: *Earth's Features* Chapter 1

Lesson 1.1	Lesson 1.2	Lesson 1.3	Color Codes
<div>Pre-unit assessment: Explain why the snails with yellow shells aren't surviving well</div>	<div>Investigating the needs of organisms in order to survive</div>	<div>Recording inferences when reading Earthworms Underground</div>	<div>Record data / observations</div>
	<div>Recording inferences of whether an organism will survive in certain environments</div>	<div>Reading reflection</div>	<div>Activate prior knowledge and reflect on understanding</div>
		<div>Concept Mapping (Word Relationships)</div>	<div>Organize and keep track of ideas</div>
	<div>Daily written reflection</div>	<div>Daily written reflection</div>	<div>Explain or persuade</div>
			<div>Sense making</div>

Writing across a chapter: *Earth's Features* Chapter 1

Lesson 1.4	Lesson 1.5	
Collecting and Analyzing Data Red Squirrel Model	Making Inferences about Grove Snails	Record data / observations
Think-Write-Pair-Share: What makes Red Squirrels more or less likely to survive?	Write a scientific explanation about what is happening with the grove snails.	Reflect on understanding
Daily written reflection	Check for Understanding	Organize or keep track of ideas
	Daily written reflection	Explain or Persuade
		Sense making

Writing across a chapter: *Earth's Features* Chapter 1

Lesson 1.1	Lesson 1.2	Lesson 1.3	Color Codes
<div>Pre-unit assessment: Explain</div> <div>Exploring the Simulation</div>	<div>Record observations and inferences from <i>Clues from the Past</i></div> <div>Reading Reflection</div>	<div>Daily written reflection</div> <div>Record observations about how a fossil forms</div> <div>Reflective Writing</div>	<div>Record data / observations</div> <div>Activate prior knowledge and reflect on understanding</div> <div>Organize and keep track of ideas</div> <div>Explain or persuade</div> <div>Sense making</div>

Writing across a chapter: *Earth's Features* Chapter 1

Lesson 1.4	Lesson 1.5	Lesson 1.6	Color Codes
Daily Written Reflection	Daily Written Reflection	Daily Written Reflection	Record data / observations
Rock Observations	How does sedimentary rock form?	Fossil in rocky outcrop model	Activate prior knowledge and reflect on understanding
Rock Formation in the Simulation		Evidence Circles	Organize and keep track of ideas
Making inferences about how rocks form		Scientific language for Evidence Circles	Explain or persuade
		Check your understanding	Sense making

Instructional supports

Sense-making strategies: How are students reading?

- Setting a purpose
- Visualizing
- Making predictions
- Asking questions
- Making inferences
- Synthesizing



Group Work

Small write sequences in Chapters 2,3, and 4

- With your group or partner pick a chapter in this unit.
- Chart the small writes within the lessons of the chapter
- Identify what purpose each small write has



Small Writes in a chapter

Gallery Walk

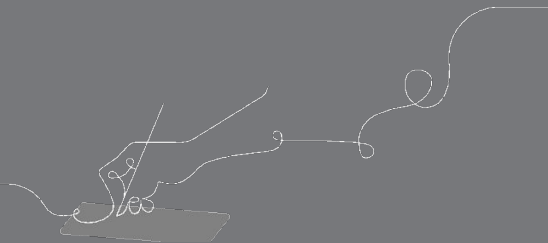


Key takeaway

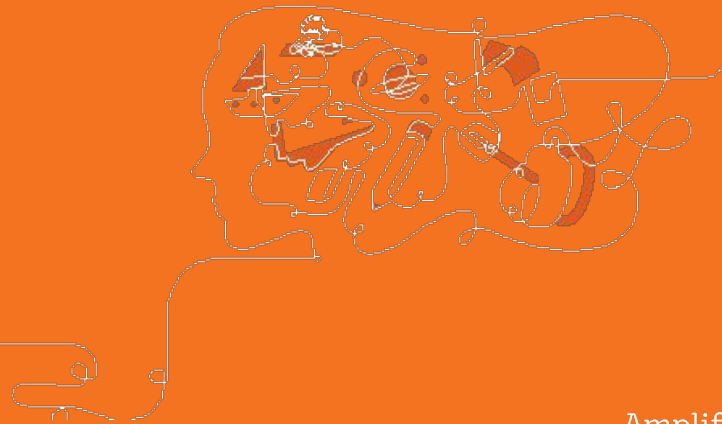
As they gather evidence, students engage in writing and discussion. They make sense of evidence they gather through small writes.

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

e



Break

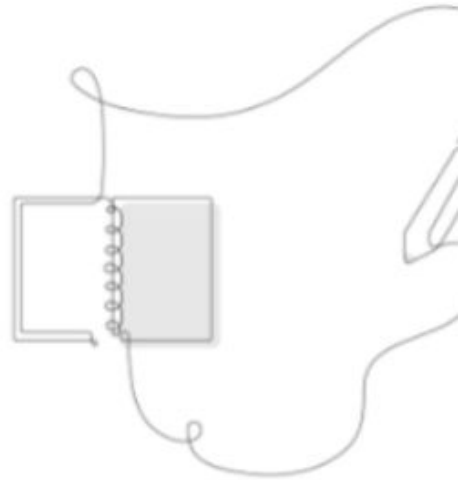
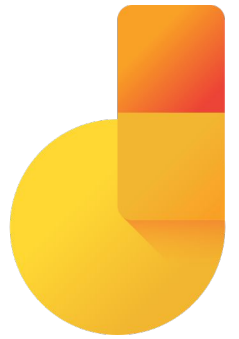




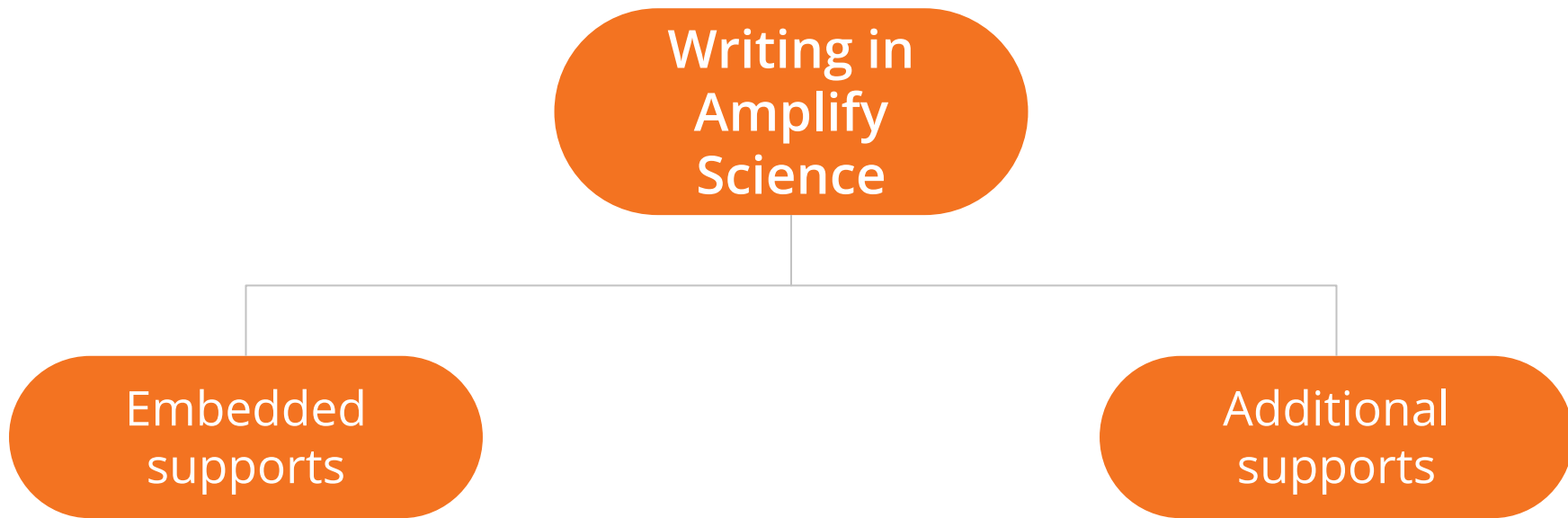
Plan for the day

- Introduction and framing
- **Writing in Amplify Science**
 - Writing as part of a multimodal experience
 - **Supporting students with writing**
 - Writing a culminating explanation or argument
 - Additional supports
- Model Lesson
- Planning
- Closing

What specific strategies
are embedded into the
curriculum to support
students to write like
scientists?



Supporting students with writing

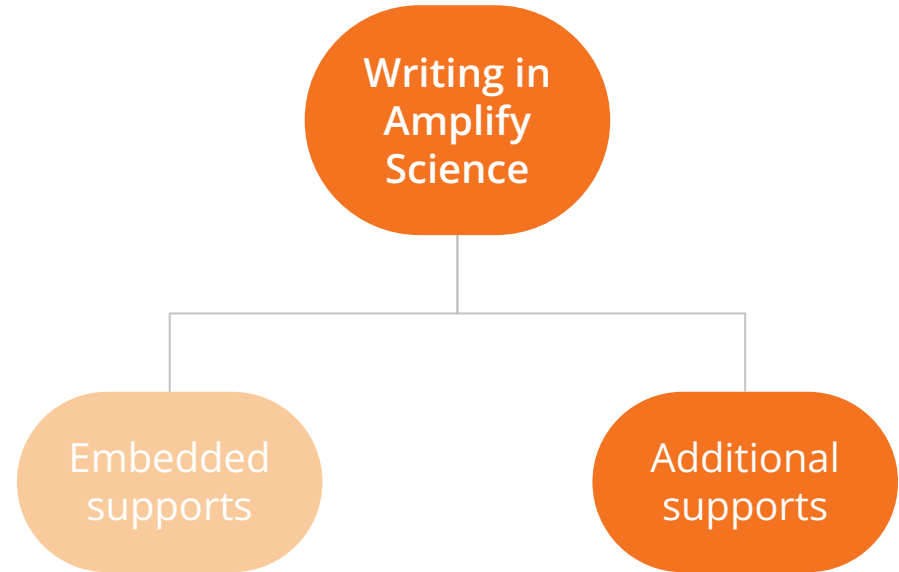


Embedded writing supports

- Smaller pieces of writing build to larger pieces of writing
- Informal talk opportunities: partners and small groups
- Sentence starters and/or language frames
- Classroom wall and other environmental print
- Word banks
- Discourse routines
- Multimodal instruction
- Gradual release of responsibility

Supporting students with writing

What additional strategies could you use to support students with writing in Amplify Science?



Additional supports

- Teacher support notes
- Possible Responses
- Differentiation notes
- Embedded Formative Assessments

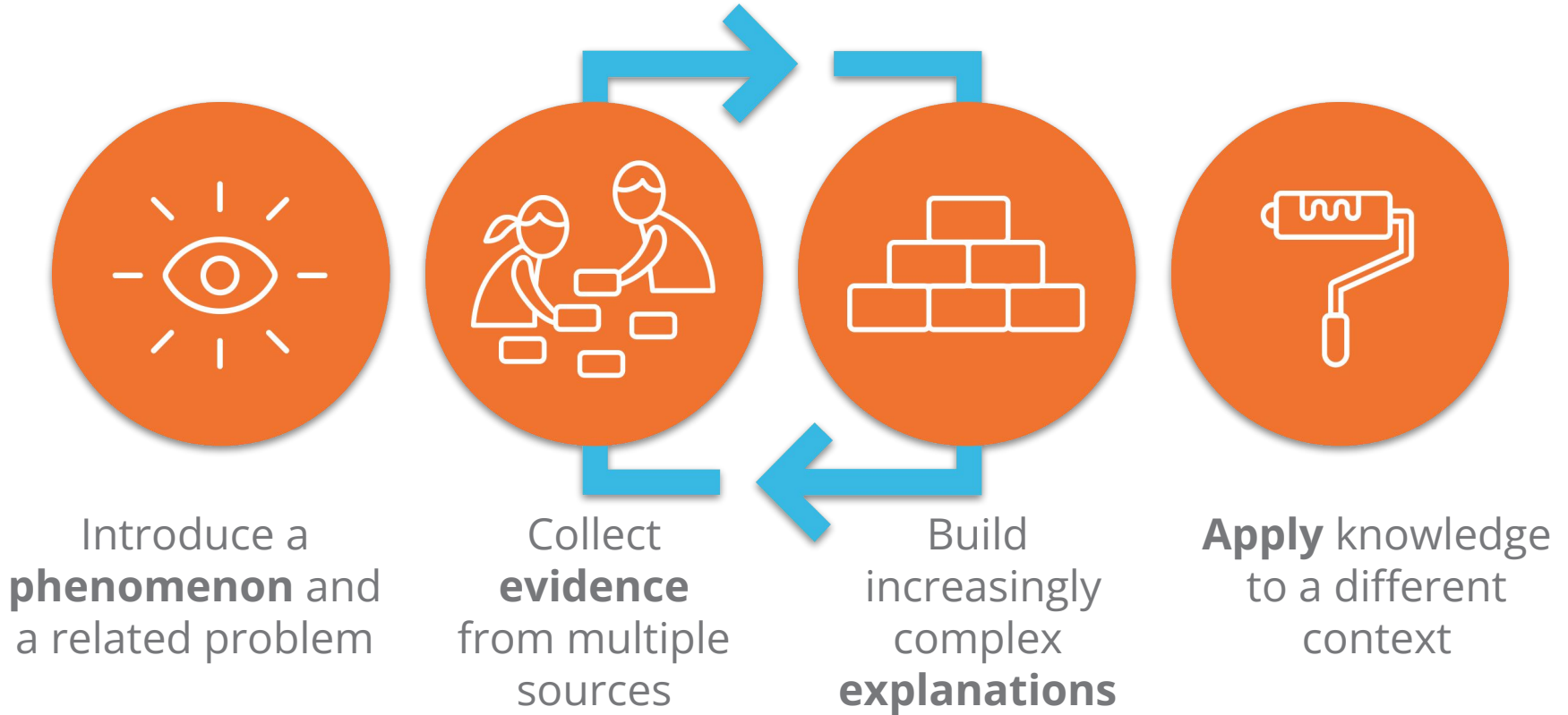




Plan for the day

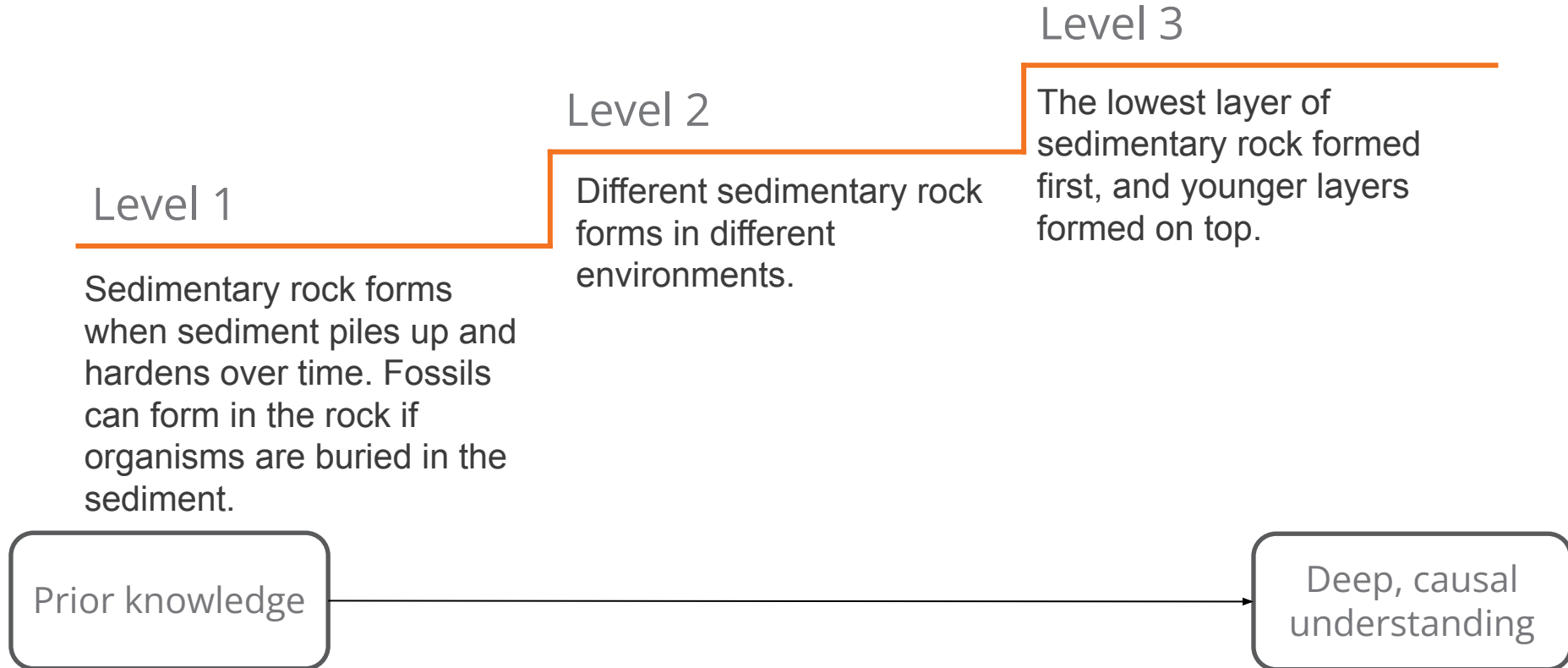
- Introduction and framing
- **Writing in Amplify Science**
 - Writing as part of a multimodal experience
 - Supporting students with writing
 - **Writing a culminating explanation or argument**
 - Additional supports
- Model Lesson
- Planning
- Closing

Instructional approach

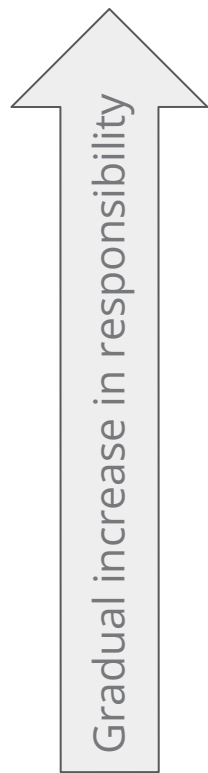


Earth's Features

Assumed prior knowledge (preconceptions): Students are expected to have had many everyday experiences with rocks and sediment and are likely to have observed rocks and sediment of different colors and textures. They are likely to have considered fossils in the context of dinosaurs, and understand that they represent organisms from the past.



Writing Build in *Earth's Features**



Ch. 4	Review guidelines	Writing a design argument using their knowledge and experiences from the previous chapters
Ch. 3	Review guidelines	Independent scientific explanation which includes more elements
Ch. 2	Review guidelines; introduce a fifth guideline	Independent writing of scientific explanation about one particular kind of snail than another
Ch. 1	Introduce guidelines	Shared writing of scientific explanation

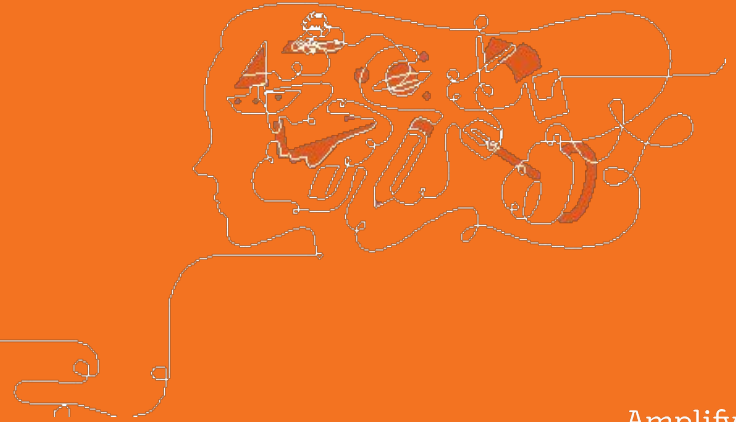
Key takeaway

Units leverage a **gradual release of responsibility model** for the formal writes.

As students work through a unit, their writing becomes more independent and sophisticated while the science content builds in complexity.



Scientific Explanations and Scientific Arguments



Share your ideas!

- **Question:** What do you think the difference is between a scientific explanation and a scientific argument?

An explanation **describes** to an audience **the invisible mechanisms or causes** that led to a phenomena.

An argument is to **convince** an audience that a **claim** (which is usually about how or why something happens) **is the best claim** given what we know.

Explanations and Arguments

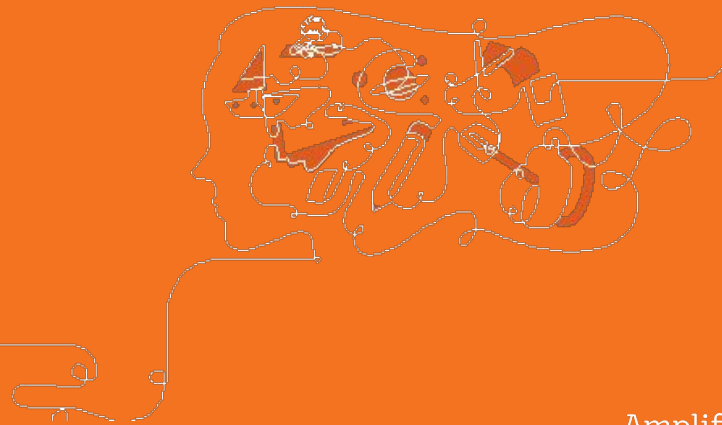
Explanation Guidelines:

1. It answers a question about how or why something happens.
2. It is based on the ideas you have learned from investigations and text.
3. It describes things that are not easy to observe.
4. It uses scientific language.
5. It is written for an audience.

Argument Guidelines:

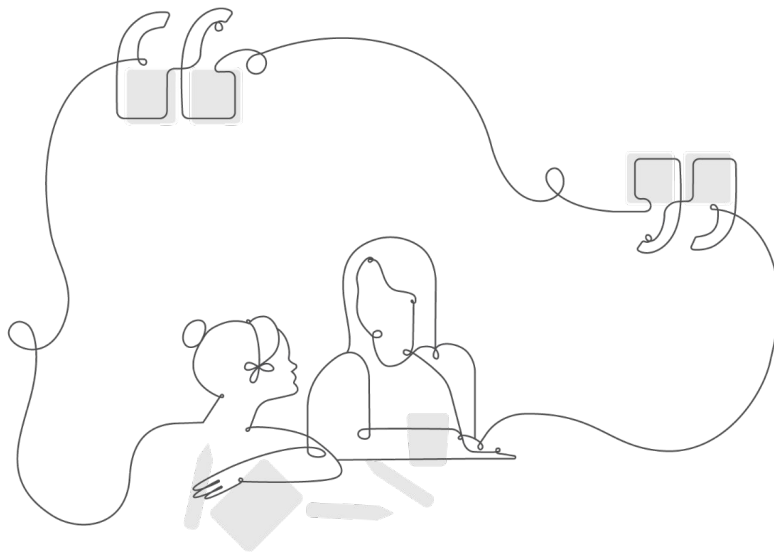
1. It answers a question with a claim about the natural world.
2. It includes evidence to support the claim. Evidence can be data and ideas.
3. It connects the evidence to the claim by linking different pieces of evidence together to show how they support the claim.
4. It uses scientific language.
5.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

End-of-Unit Writing: Explanations or Arguments



Quick poll

Have you explored the End-of-Unit Assessment Guide for any Amplify Science units?



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] formative (K-1)
summative (2-5)
- Rubric 3: Assessing Students' Performance of the Practice of Constructing Scientific Arguments] formative

Work time: End of unit Assessment Guide

Become familiar with your EOU Assessment Guide

- What is the prompt for students? (check in the Assessment Guide and in the lesson activity itself)
- What does each rubric assess?

Reflection prompt:

- How could the EOU Assessment Guide help your planning and instruction throughout the unit?

Key takeaway

Different writing activities play different roles within the curriculum.

Providing support for writing will look different depending on the activity.





Plan for the day

- Introduction and framing
- Writing in Amplify Science
 - Writing as part of a multimodal experience
 - Supporting students with writing
 - Writing a culminating explanation or argument
 - Additional supports
- Model Lesson
- Planning
- Closing

Supplemental Investigation Notebook Pages

Daily Written Reflections

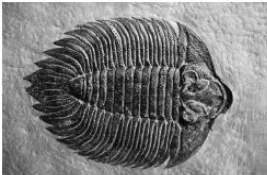
Example questions:

- How do you think this fossil formed?


Name: _____ Date: _____

Daily Written Reflection

This is a fossil of a trilobite, an insect-like organism that lived a long time ago.
How do you think this fossil formed?



Make a drawing if it helps you explain your thinking. Label your drawing.



8 Earth's Features—Lesson 1.3 (optional)
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Supplemental Investigation Notebook Pages

Name: _____ Date: _____

Reading Reflection: *Arguing to Solve a Mystery*

1. Read each question below.
2. Use what you read in *Arguing to Solve a Mystery* to help you answer each question.
3. Use evidence from the text to support your thinking.

How did Walter Alvarez use evidence from rock layers to support his claim?

What evidence did Courtney Sprain use to support her claim?

Why do you think it is important for scientists to support their claims with evidence?

What do you think is the strongest argument for why the dinosaurs went extinct? Why do you think so?

Reading Reflections

- How did Walter Alvarez use evidence from rock layers to support his claim?
- What evidence did Courtney Sprain use to support her claim?
- Why do you think it is important for scientists to support their claims with evidence?
- What do you think is the strongest argument for why the dinosaurs went extinct?

Optional scaffolding writing copymasters


Name: _____

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



(Image credits left, Shutterstock, right, Sheddgraphs via CC BY-SA 3.0)

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


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



(Image credits left, Shutterstock, right, Sheddgraphs 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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Earth's Features—Lesson 3.5 (Version A)

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Version A

Name: _____

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

1. Write a scientific argument that answers the question: **What was the environment when the unknown rock layer formed?**

2. Your audience is the park director at Desert Rocks Canyon.

Name: _____ Date: _____

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

The data shows that _____

I know that _____


I also know that _____

This means that _____

The data shows that _____

I know that _____

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



(Image credits: left, Shutterstock)

Earth's Features—Lesson 3.5

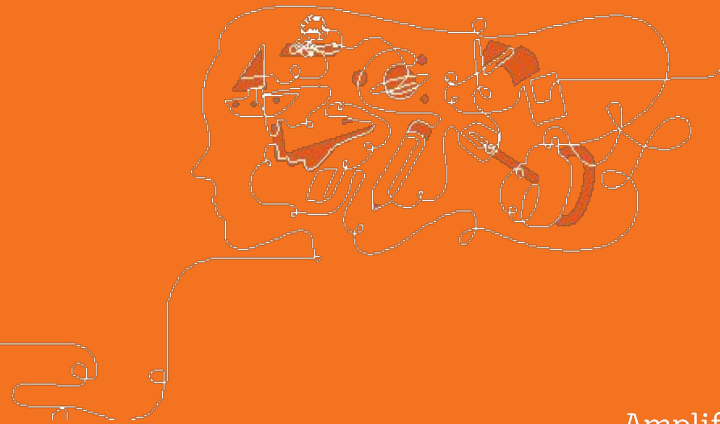
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Earth's Features—Lesson 3.5 (Version B)

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Version B

Lunch Break






Plan for the day


- Introduction and framing
- Writing in Amplify Science
 - Writing as part of a multimodal experience
 - Supporting students with writing
 - Writing a culminating explanation or argument
 - Additional supports
- Model Lesson
- Planning
- Closing

Unpacking the lesson


First, let's look at what we need to do before engaging in the lesson.

Lesson 1.3: Fossil Formation

 Printable Lesson Guide

 2


SIM
Investigating Fossils in the
Simulation


 3

STUDENT-TO-STUDENT
DISCUSSION
Discussing Fossils

4

WRITING
Reflecting on How Fossils
Form



 RESET LESSON

Overview

Materials & Preparation

Differentiation

Standards






Vocabulary

Unplugged?

Overview

In this lesson, students gather information from images of fossils, the Simulation, and a book to help them answer the Investigation Question: *How do fossils form?* First, students observe two images of fossils and begin to consider how fossils form. Then, students gather information in the Sim about how fossils form and use that information to tell a story about the organisms in the Sim and how they fossilized. Students then revisit *Clues from the Past* and consider what additional information it provides about fossil formation. The lesson concludes with a reflective writing activity during which students apply their understanding of fossil formation to explain how an unfamiliar fossil formed. The purpose of this lesson is for students to construct and reflect on their understanding of how fossils form.

Digital Resources

-  Classroom Slides 1.3 | PowerPoint
-  Classroom Slides 1.3 | Google Slides
-  All Projections
-  Earth's Features Investigation Notebook, pages 8–10
-  Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds

Focusing on lesson's purpose

Teacher tip: Use the Lesson Overview to get a big picture of the lesson and its learning sequence.

Teacher tip: The purpose statement highlights the main reason for the lesson.

Reflection: How might the lesson purpose statement help you when you're planning?

Lesson 1.3:
Fossil Formation

[Printable Lesson Guide](#)

2 SIM Investigation Simulation Fossils in the 3 STUDENT-TO-STUDENT DISCUSSION Discussing Fossils 4 WRITING Reflecting on How Fossils Form

[RESET LESSON](#)

Overview

Materials & Preparation
Differentiation
Standards
Vocabulary
Unplugged?

Overview

In this lesson, students gather information from images of fossils, the Simulation, and a book to help them answer the Investigation Question: *How do fossils form?* First, students observe two images of fossils and begin to consider how fossils form. Then, students gather information in the Sim about how fossils form and use that information to tell a story about the organisms in the Sim and how they fossilized. Students then revisit *Clues from the Past* and consider what additional information it provides about fossil formation. The lesson concludes with a reflective writing activity *during which students apply their understanding of fossil formation* to explain how an unfamiliar fossil formed. The purpose of this lesson is for students to construct and reflect on their understanding of how fossils form.

Digital Resources

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- [Earth's Features Investigation Notebook, pages 8-10](#)
- [Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds](#)

Unit Anchor Phenomenon

Problem students work to solve

Chapter-level Anchor Phenomenon Chapter 1 Question

Investigation Questions

Evidence sources and reflection opportunities

Key concepts

Application of key concepts to problem

Explanation that students can make to answer the Chapter 1 Question

Earth's Features: Mystery in Desert Rocks Canyon

A rocky outcrop in Desert Rocks National Park has rock layers and a fossil in it.
What was the environment of Desert Rocks National Park like in the past?

A rocky outcrop in Desert Rocks National Park has a fossil in it
How did the fossil get inside the rocky outcrop?

How do fossils form? (1.2-1.3)
(Note: See Lesson Overviews for lesson-level Investigative Phenomena)

- Discuss initial ideas about rocks and fossils, add them to the Rocks and Fossils Anticipatory Chart (1.1)
- Read *Clues from the Past* (1.2)
- Observe fossils (1.3)
- Use the Sim to investigate how fossils form (1.3)

- A fossil forms when an organism dies and is covered with sediment that turns into rock. (1.3)

How does sedimentary rock form? (1.4-1.5)
(Note: See Lesson Overviews for lesson-level Investigative Phenomena)

- Observe conglomerate rock samples (1.4)
- Use the Sim to investigate how sedimentary rock forms (1.4)
- Revisit *Clues from the Past* to obtain information about how sedimentary rock forms (1.5)
- Develop student sedimentary rock formation models (1.5)
- Discuss and evaluate the class sedimentary rock formation model (1.5)
- Revisit the Rocks and Fossils Anticipatory Chart to reflect on new ideas (1.5)

- A sedimentary rock layer forms when sediment sinks and builds up in water, compacts under more sediment, and cements over time. (1.5)
- Over time, a rock layer becomes thicker as sediment continues to build up. (1.5)

- Make a model to help answer the Chapter 1 Question (1.6)

The fossil is the preserved remains of an organism that lived a long time ago. The fossil formed when the organism died and sediments sank through the water and completely covered its body. More and more sediment continued to build up over the body. As more sediment landed on top, it compacted the sediment that was already there. That sediment cemented and became rock. This process gradually made a thicker and thicker rock layer. Parts of the organism became preserved in this rock layer.

Unit Anchor Phenomenon

Problem students work to solve

Chapter-level Anchor Phenomenon Chapter 1 Question

Investigation Questions

Evidence sources and reflection opportunities

Key concepts

Application of key concepts to problem

Explanation that students can make to answer the Chapter 1 Question

Earth's Features: Mystery in Desert Rocks Canyon

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How did the fossil get inside the rock?

How do fossils form? (1.2-1.3)
(Note: See Lesson Overviews for lesson phenomena)

- Discuss initial ideas about rocks and fossils, add them to the Rocks and Fossils Anticipatory Chart (1.1)
- Read *Clues from the Past* (1.2)
- Observe fossils (1.3)
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- Discuss initial ideas about rocks and fossils, add them to the Rocks and Fossils Anticipatory Chart (1.1)
- Read *Clues from the Past* (1.2)
- Observe fossils (1.3)
- Use the Sim to investigate how fossils form (1.3)

Sedimentary rock forms (1.5)

- Develop student sedimentary rock formation models (1.5)
- Discuss and evaluate the class sedimentary rock formation model (1.5)
- Revisit the Rocks and Fossils Anticipatory Chart to reflect on new ideas (1.5)

- A sedimentary rock layer forms when sediment sinks and builds up in water, compacts under more sediment, and cements over time. (1.5)
- Over time, a rock layer becomes thicker as sediment continues to build up. (1.5)

Unit Anchor Phenomenon

Problem students work to solve

Chapter-level Anchor Phenomenon Chapter 1 Question

Investigation Questions

Earth's Features: Mystery in Desert Rocks Canyon

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How do fossils form? (1.2-1.3)
(Note: See Lesson Overviews for lesson-level Investigative Phenomena)

How does sedimentary rock form? (1.4-1.5)
(Note: See Lesson Overviews for lesson-level Investigative Phenomena)

- A fossil forms when an organism dies and is covered with sediment that turns into rock. (1.3)

Key concepts

Application of key concepts to problem

Explanation that students can make to answer the Chapter 1 Question

- A fossil forms when an organism dies and is covered with sediment that turns into rock. (1.3)

- A sedimentary rock layer forms when sediment sinks and builds up in water, compacts under more sediment, and cements over time. (1.5)
- Over time, a rock layer becomes thicker as sediment continues to build up. (1.5)

- Make a model to help answer the Chapter 1 Question (1.6)













The fossil is the preserved remains of an organism that lived a long time ago. The fossil formed when the organism died and sediments sank through the water and completely covered its body. More and more sediment continued to build up over the body. As more sediment landed on top, it compacted the sediment that was already there. That sediment cemented and became rock. This process gradually made a thicker and thicker rock layer. Parts of the organism became preserved in this rock layer.

Printable Resources

Coherence Flowcharts

- Navigate to Printable Resources on the Unit Landing Page
 - Open the Coherence Flowchart

Printable Resources

- 
- | | |
|--|--|
|  3-D Assessment Objectives |  Coherence Flowcharts |
|  Copymaster Compilation |  Crosscutting Concept Tracker |
|  Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds |  Flexextension Compilation |
|  Investigation Notebook |  Multi-Language Glossary |
|  NGSS Information for Parents and Guardians |  Print Materials (8.5" x 11") |
|  Print Materials (11" x 17") | |

Formative Assessments: Monitoring Students Progress

Preparing Students For Lesson 1.3

On-the-Fly Assessments

Lesson 1.2, Activity 4

- Distinguishing between observations and inferences

Lesson 1.3, Activity 2

- How fossils form

Unit Overview Chapters Printable Resources Planning for the Unit ▾ Teacher References ▲ Lesson Overview Compilation Standards and Goals 3-D Statements Assessment System Embedded Formative Assessments Books in This Unit Apps in This Unit Opportunities for Unit Extensions Flextensions in This Unit Offline Preparation	On-the-Fly Assessments at a Glance	
	On-the-Fly Assessments	Assessment Focus
	On-the-Fly Assessment 1: Observations and Inferences (Lesson 1.2, Activity 4)	<ul style="list-style-type: none">• distinguishing between observations and inferences
	On-the-Fly Assessment 2: How Fossils Form (Lesson 1.3, Activity 4)	<ul style="list-style-type: none">• how fossils form
	On-the-Fly Assessment 3: How Sedimentary Rock Forms (Lesson 1.4, Activity 4)	<ul style="list-style-type: none">• how sedimentary rock forms• making inferences
	On-the-Fly Assessment 4: Identifying Inferences in <i>Through the Eyes of a Geologist</i> (Lesson 2.1, Activity 3)	<ul style="list-style-type: none">• Identifying inferences in scientific text
	On-the-Fly Assessment 5: Ideas About Rocks and Environments (Lesson 2.2, Activity 3)	<ul style="list-style-type: none">• different sedimentary rocks form in different environments• different sedimentary rocks have sediment of different sizes
	On-the-Fly Assessment 6: Environments and Rock Types (Lesson 2.3, Activity 3)	<ul style="list-style-type: none">• how sediment size is related to depositional environment• how rock type can help geologists infer past environments

Monitoring Students Progress: On-the-Fly and Critical Juncture

Critical Juncture Assessment

1.6, Act 1



On-the-Fly Assessments

1.2, Act 4

1.3, Act 4

1.3, Act 4



Level 2

Level 3

What is adaptive can change when the environment changes

There can be adaptive and non-adaptive traits in a population.

Level 1

When it is easier for organisms to meet their needs in an environment, they are more likely to survive.

Planning Lesson 1.3

Lesson 1.3: Fossil Formation

Printable Lesson Guide

2

SIM
Investigating Fossils in the
Simulation

3

STUDENT-TO-STUDENT
DISCUSSION
Discussing Fossils

4

WRITING
Reflecting on How Fossils
Form

RESET LESSON

Overview

Materials & Preparation

Differentiation

Standards

Vocabulary

Unplugged?

Overview

In this lesson, students gather information from images of fossils, the Simulation, and a book to help them answer the Investigation Question: *How do fossils form?* First, students observe two images of fossils and begin to consider how fossils form. Then, students gather information in the Sim about how fossils form and use that information to tell a story about the organisms in the Sim and how they fossilized. Students then revisit *Clues from the Past* and consider what additional information it provides about fossil formation. The lesson concludes with a reflective writing activity during which students apply their understanding of fossil formation to explain how an unfamiliar fossil formed. The purpose of this lesson is for students to construct and reflect on their understanding of how fossils form.

Digital Resources

Classroom Slides 1.3 | PowerPoint

Classroom Slides 1.3 | Google Slides

All Projections

Earth's Features Investigation Notebook, pages 8–10


Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds


Planning Lesson 1.3


Lesson Brief


Step 1: Download the **Classroom Slides** and review them.


Lesson 1.3: Fossil Formation

 Printable Lesson Guide

 2 SIM Investigating Fossils in the Simulation

 3 STUDENT-TO-STUDENT DISCUSSION Discussing Fossils

 4 WRITING Reflecting on How Fossils Form

 RESET LESSON

Overview

Materials & Preparation

Differentiation

Standards






Vocabulary

Unplugged?

Overview

In this lesson, students gather information from images of fossils, the Simulation, and a book to help them answer the Investigation Question: *How do fossils form?* First, students observe two images of fossils and begin to consider how fossils form. Then, students gather information in the Sim about how fossils form and use that information to tell a story about the organisms in the Sim and how they fossilized. Students then revisit *Clues from the Past* and consider what additional information it provides about fossil formation. The lesson concludes with a reflective writing activity during which students apply their understanding of fossil formation to explain how an unfamiliar fossil formed. The purpose of this lesson is for students to construct and reflect on their understanding of how fossils form.

Digital Resources

-  Classroom Slides 1.3 | PowerPoint
-  Classroom Slides 1.3 | Google Slides
-  All Projections
-  Earth's Features Investigation Notebook, pages 8–10
-  Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds

Planning Lesson 1.3

Lesson Brief

Step 2: Read the Overview.

The Purpose of this Lesson: To construct and reflect on their understanding of how fossils form.

Learning Objectives

Overview
Materials & Preparation
Differentiation
Standards
Vocabulary
Unplugged?



Overview

In this lesson, students gather information from images of fossils, the Simulation, and a book to help them answer the Investigation Question: *How do fossils form?* First, students observe two images of fossils and begin to consider how fossils form. Then, students gather information in the Sim about how fossils form and use that information to tell a story about the organisms in the Sim and how they fossilized. Students then revisit *Clues from the Past* and consider what additional information it provides about fossil formation. The lesson concludes with a reflective writing activity during which students apply their understanding of fossil formation to explain how an unfamiliar fossil formed. The purpose of this lesson is for students to construct and reflect on their understanding of how fossils form.

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

Chapter-level Anchor Phenomenon: A rocky outcrop in Desert Rocks National Park has a fossil in it.

Investigative Phenomenon: One rock has fossil dinosaur bones, and another has fossil fish bones

Students learn:

- A fossil forms when an organism dies and is covered with sediment that turns into rock.
- Sedimentary rock forms from sediment.

Lesson at a Glance

1: Observing Fossils (10 min.)

Students observe images of fossils to initiate ideas about how they form.

2: Investigating Fossils in the Simulation (20 min.)

Students make fossils in the Sim and begin to construct ideas about how fossils form.

3: Discussing Fossils (20 min.)

Students revisit *Clues from the Past* and talk with a partner to add to and consolidate their thinking about fossil formation.

4: Reflecting on How Fossils Form (10 min.)

Students draw on information they gathered throughout the lesson to complete a reflective writing activity about how an unfamiliar fossil may have formed. This activity provides an opportunity for an On-the-Fly Assessment of students' understanding of how fossils form.

Digital Resources

Classroom Slides 1.3 | PowerPoint

Classroom Slides 1.3 | Google Slides

All Projections

Earth's Features Investigation Notebook, pages 8–10

Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds

Quick check:

Lesson timing and pacing

How much time do you have in your schedule for each science lesson?



Lesson at a Glance: Pacing

- Are there activities that might take slightly more or less time?
- Should you split the lesson over two days?

Lesson at a Glance

1: Observing Fossils (10 min.)

Students observe images of fossils to initiate ideas about how they form.

2: Investigating Fossils in the Simulation (20 min.)

Students make fossils in the Sim and begin to construct ideas about how fossils form.

3: Discussing Fossils (20 min.)

Students revisit *Clues from the Past* and talk with a partner to add to and consolidate their thinking about fossil formation.

4: Reflecting on How Fossils Form (10 min.)

Students draw on information they gathered throughout the lesson to complete a reflective writing activity about how an unfamiliar fossil may have formed. This activity provides an opportunity for an On-the-Fly Assessment of students' understanding of how fossils form.

Lesson at a Glance: Pacing

Day 1: (30 minutes)

Act 1: Observing Fossils (10 min)

Act 2: Investigating Fossils in the Simulation
(20 min)

Day 2: (30 minutes)

Act 3: Discussion Fossils (20 min)

Act 4: Reflecting on How Fossils Form
(On-the-Fly) (10 min)

Lesson at a Glance

1: Observing Fossils (10 min.)

Students observe images of fossils to initiate ideas about how they form.

2: Investigating Fossils in the Simulation (20 min.)

Students make fossils in the Sim and begin to construct ideas about how fossils form.

3: Discussing Fossils (20 min.)

Students revisit *Clues from the Past* and talk with a partner to add to and consolidate their thinking about fossil formation.

4: Reflecting on How Fossils Form (10 min.)

Students draw on information they gathered throughout the lesson to complete a reflective writing activity about how an unfamiliar fossil may have formed. This activity provides an opportunity for an On-the-Fly Assessment of students' understanding of how fossils form.

Planning for Pacing - Earth's Features (Example)

Sample time in my Science block.	Day 1 (30 min)	Day 2 (30 min)	Day 3 (45 min)	Day 4 (55 min)	Day 5 (20 min)
	1.3: Fossil Formation	1.3 cont.	1.4: Sedimentary Rock Formation	1.4 cont.	1.5: cont.
	Activity 1: Observing Fossils (10 min.)	Activity 3: Discussing Fossils (20 min.)	Activity 1: Investigating Maps (10 min.)	Activity 4: Reflecting on How Rocks Form (15 min)	Activity 3: Analyzing the Model (10 min)
	Activity 2: Investigating Fossils in the Simulation (20 min)	Activity 4: Reflecting on How Fossils Form (10 min.)	Activity 2: Observing Rocks (15 min) Activity 3: Rock Formation in the Simulation (20 min)	1.5: Modeling Sedimentary Rock Formation Activity 1: Reading About Rock Formation (15 min) Activity 2: Sedimentary Rock Formation Model (25 min)	Activity 4: Revisiting the Rocks and Fossils Chart (10 min)

Week 1 Pacing

Monday

Tuesday

Wednesday

Thursday

Friday

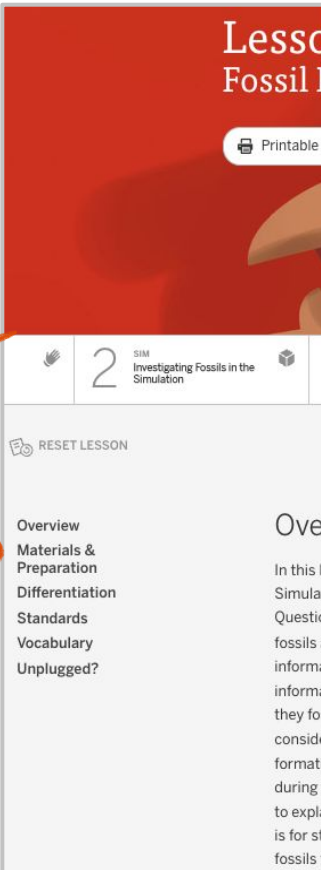


<http://bit.ly/3Xx4S18>

Planning Lesson 1.3

Lesson Brief

Step 3: Read the **Materials and Preparation** Document



The screenshot shows a lesson brief interface. At the top, there's a red header with the text "Lesson 1.3 Investigating Fossils in the Simulation" and a "Printable" button. Below the header is a navigation bar with a "RESET LESSON" button and a list of sections: Overview, Materials & Preparation, Differentiation, Standards, Vocabulary, and Unplugged?. An orange arrow points from the "Materials & Preparation" section in the navigation bar to a detailed view of that section on the right.

Materials & Preparation

Materials

For the Classroom Wall

- key concept: *A fossil forms when an organism dies and is covered with sediment that turns into rock.*
- vocabulary: *model, sediment*

For the Class

- masking tape*
- paper clips*

For Each Group of Four Students

- Fossil cards, clipped together

For Each Pair of Students

- 1 digital device*
- 1 hand lens*
- 1 copy of *Clues from the Past*

For Each Student

- *Earth's Features* Investigation Notebook (pages 8–10)

*teacher provided

Resources

- Lesson 1.3 | PowerPoint
- Lesson 1.3 | Google Slides
- Investigation Notebook,
- Encouraging Students' Prior Personal Experiences, and Cultural

Planning Lesson 1.3

Lesson Brief

Read the **Materials & Preparation**.

For the Classroom Wall

- key concept: *A fossil forms when an organism dies and is covered with sediment that turns into rock.*
- vocabulary: *model, sediment*

A fossil forms when an organism dies and is covered with sediment that turns into rock.

model

Earth's Features—Vocabulary—Lesson 1.3—AAP020633.06-4ES
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sediment

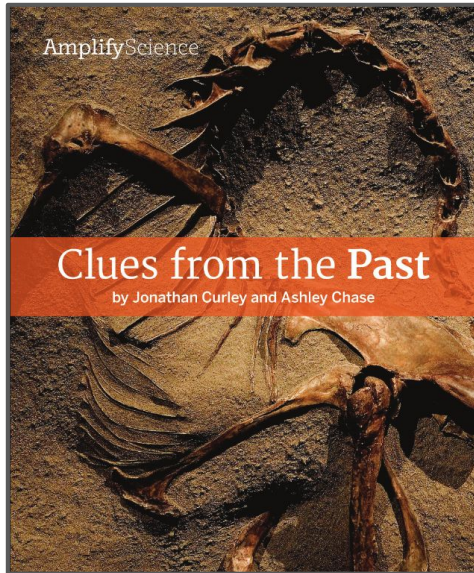
Earth's Features—Vocabulary—Lesson 1.3—AAP020633.06-4ES
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Earth's Features—Key Concepts—Lesson 1.3—AAP020633.06-4ES
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Planning Lesson 1.3

Lesson Brief

Read the **Materials & Preparation.**



For the Class

- masking tape*
- paper clips*

For Each Group of Four Students

- Fossil cards, clipped together

For Each Pair of Students

- 1 digital device*
- 1 hand lens*
- 1 copy of *Clues from the Past*

For Each Student

- *Earth's Features Investigation Notebook* (pages 8–10)

*teacher provided



Planning Lesson 1.3

Lesson Brief

Read the **Materials & Preparation**.

BACK Earth's Features

Simulation

1
Earth's Features

Science Practice Tools

1
1.6 Fossil Formation Model

2
3.2 Rock Layers Model

3
4.4 Erosion: Speed Model

4
4.4 Erosion: Time Model

Student Books

1
Arguing to Solve a Mystery

2
Clues from the Past

3
Fossil Hunter's Handbook

4
Rocky Wonders

Overview Preparation

River Speed: **FAST** SLOW + ADD ORGANISMS

TIME PASSED: 0 Years RESET

Sea Level

ENVIRONMENT: Upper River

ENVIRONMENT: Floodplain

ENVIRONMENT: Beach

LOW

1 2 3

ANALYZE LAYERS

English Español

Planning Lesson 1.3

Lesson Brief

Step 3: Read the
Differentiation document



Lesson 1.3: Fossil Formation

[Printable Lesson Guide](#)

2

SIM
Investigating Fossils in the
Simulation

3

STUDENT-TO-STUDENT
DISCUSSION
Discussing Fossils

4

WRITING
Reflecting on How Fossils
Form

RESET LESSON

Overview

Materials & Preparation

Differentiation

Standards

Vocabulary

Unplugged?

Overview

In this lesson, students gather information from images of fossils, the Simulation, and a book to help them answer the Investigation Question: *How do fossils form?* First, students observe two images of fossils and begin to consider how fossils form. Then, students gather information in the Sim about how fossils form and use that information to tell a story about the organisms in the Sim and how they fossilized. Students then revisit *Clues from the Past* and consider what additional information it provides about fossil formation. The lesson concludes with a reflective writing activity during which students apply their understanding of fossil formation to explain how an unfamiliar fossil formed. The purpose of this lesson is for students to construct and reflect on their understanding of how fossils form.

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

Chapter-level Anchor Phenomenon: A rocky outcrop in Desert Rocks National Park has a fossil in it.

Investigative Phenomenon: One rock has fossil dinosaur bones, and

Digital Resources






- Classroom Slides 1.3 | PowerPoint
- Classroom Slides 1.3 | Google Slides
- All Projections
- Earth's Features Investigation Notebook, pages 8–10
- Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds


Planning Lesson 1.3

Lesson Brief

Read the **Differentiation**

- Embedded Supports for Diverse Learners
- Potential Challenges in This Lesson
- English Learners
- Students Who Need More Support
- Students Who Need More Challenge

<p>Overview</p> <p>Materials & Preparation</p> <p>Differentiation</p> <p>Standards</p> <p>Vocabulary</p> <p>Unplugged?</p>	<h3>Differentiation</h3> <h4>Embedded Supports for Diverse Learners</h4> <p>Multimodal instruction. This lesson includes making observations of photographs, structured discussion, reading, and use of the Simulation. This multimodal instruction provides students with many opportunities to make sense of concepts and provides access points for different types of learners.</p> <p>Time for reflection. This lesson concludes with a written reflection in which students have a chance to make sense of what they have been learning and apply their new understanding about how fossils form. Providing this time for reflection allows students to consolidate learning and offers a window into students' thinking, which can be helpful for identifying and addressing alternate or partial conceptions.</p> <p>Using the <i>Earth's Features Simulation</i>. The Simulation provides a rich visual environment in which students can explore and test out ideas they are learning in the unit. A major benefit of the Simulation is that it allows students to see a model of processes that take millions of years happening in a few seconds. In this lesson, students use the Simulation to observe how fossils form, and connect this experience with their observations of fossils.</p> <p>Discourse routine. In this lesson, students are introduced to the Think-Pair-Share discourse routine, which they will use throughout the unit. Engaging in this routine allows students to activate their prior knowledge and discuss science ideas. It also helps students practice active-listening skills. This routine is especially helpful for English learners as it allows students to hear models of language from their peers before sharing with the whole class.</p> <h4>Potential Challenges in This Lesson</h4> <p>Understanding models. The Simulation is a model that helps students observe something that is impossible to see firsthand. It may be challenging for some students to apply what they have read about in <i>Clues from the Past</i> to their observations of rocks forming in the Sim. Students will work with physical and digital models throughout the unit and will have several opportunities to return to</p>	<h3>Digital Resources</h3> <ul style="list-style-type: none"> Classroom Slides 1.3 PowerPoint Classroom Slides 1.3 Google Slides All Projections Earth's Features Investigation Notebook, pages 8–10 Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds
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**Now we are
ready to teach
the lesson.**



Grade 4 | Earth's Features

Lesson 1.3: Fossil Formation

Activity 1

Observing Fossils



Today, we are going to investigate this question:

How do fossils form?



Earth's Features—Fossil Cards—Lesson 1.3—HAP050613.01-465
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Image credit: Shutterstock



Earth's Features—Fossil Cards—Lesson 1.3—HAP050613.01-465
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Image credit: Science Source

We'll start by **looking at**
images of real **fossils**
and **making some**
observations about
them.



Observing Fossils



Step 1

Observe your fossil image with the hand lens and discuss your observations with your partner.



Step 2

After you have observed the fossil, **switch fossils** with another pair.



Step 3

Observe the second fossil image with the hand lens and discuss your observations with your partner.



Earth's Features—Fossil Cards—Lesson 1.3—AAP025613.01-4E5
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Image credit: Shutterstock



Earth's Features—Fossil Cards—Lesson 1.3—AAP025613.01-4E5
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Image credit: Science Source



What do you **observe** about the fossils?

I observe _____ about the fossils.



Earth's Features—Fossil Cards—Lesson 1.3—HAP020623.01-465
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Earth's Features—Fossil Cards—Lesson 1.3—HAP020623.01-465
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Image credit: Science Source



How do you think
fossils **form**?

What makes you think
so? What did you see
that makes you
think that?

I think fossils form by _____

because _____.

Activity 2

Investigating Fossils in the Simulation



Vocabulary



model

**something scientists make to answer questions
about the real world**

Name: _____ Date: _____

How a Fossil Forms

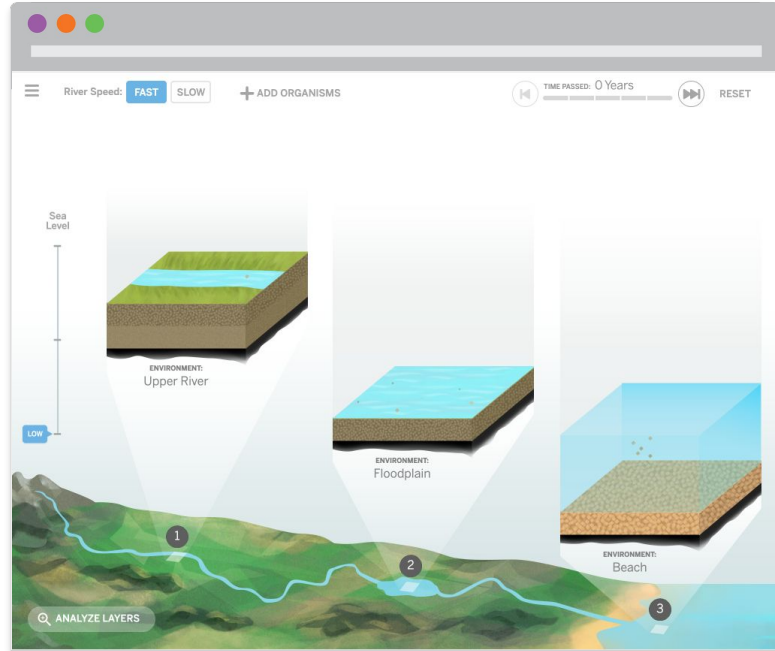
1. Using the *Earth's Features* Simulation, work with your partner to observe how a fossil forms.
2. Press ADD ORGANISMS.
3. Move time forward until a fossil forms.
4. Answer the questions below based on what you observed in the Sim.

How do you think fossils form?

Can you find an environment in the Sim where a fossil does not form? What did you observe about that environment?

Turn to page 9 in your notebooks.

We will investigate
fossils in the Simulation.



Earth's Features Sim



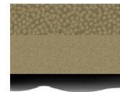
Time controls



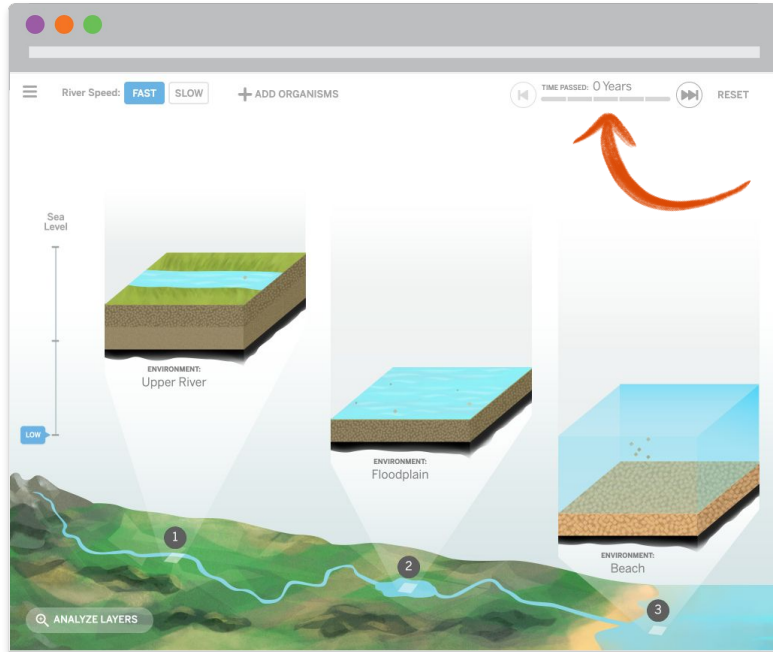
Add organisms



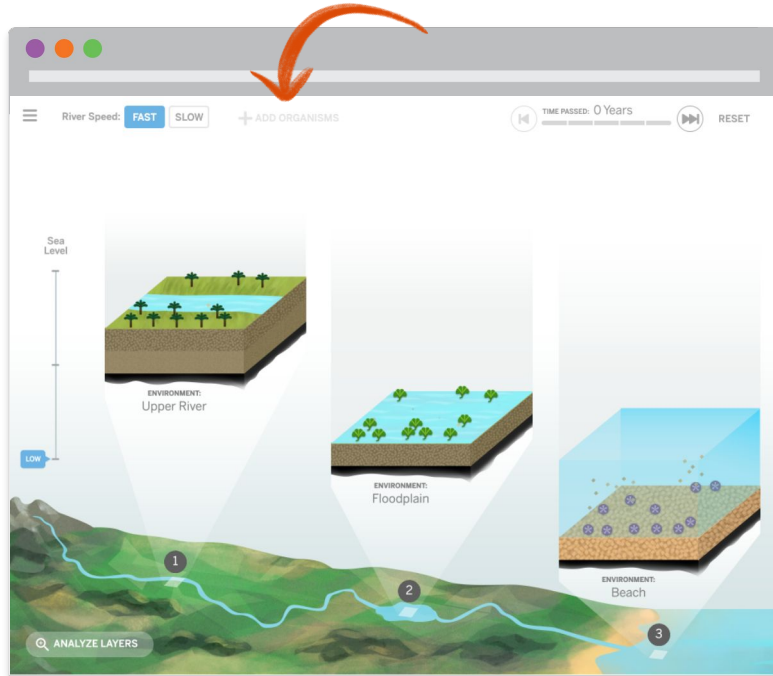
Analyze layers



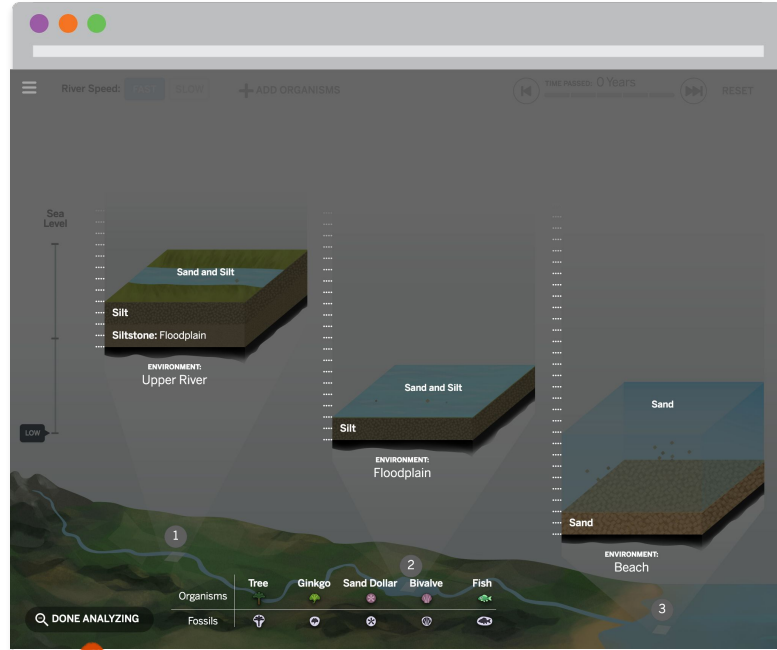
Rock and sediment layers



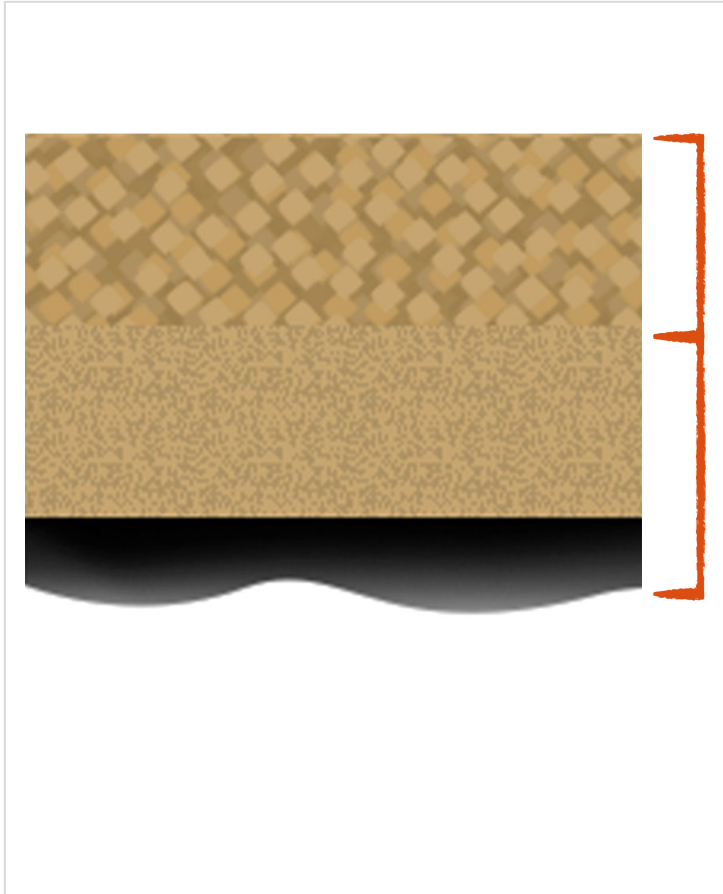
Time can be moved forward or backward by 10,000 years.



Organisms can be added to each location by pressing this button.



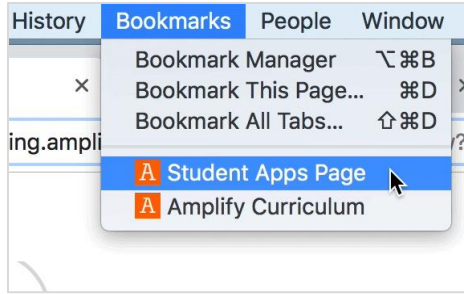
Selecting **ANALYZE LAYERS** reveals the types of rock, sediment, organisms, and fossils in each location. This also reveals the depth of the canyon in location 1.



The top layer with larger pieces is a **sediment** layer.

The lower, smoother layers are **rock**.

Open the Simulation



Step 1

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



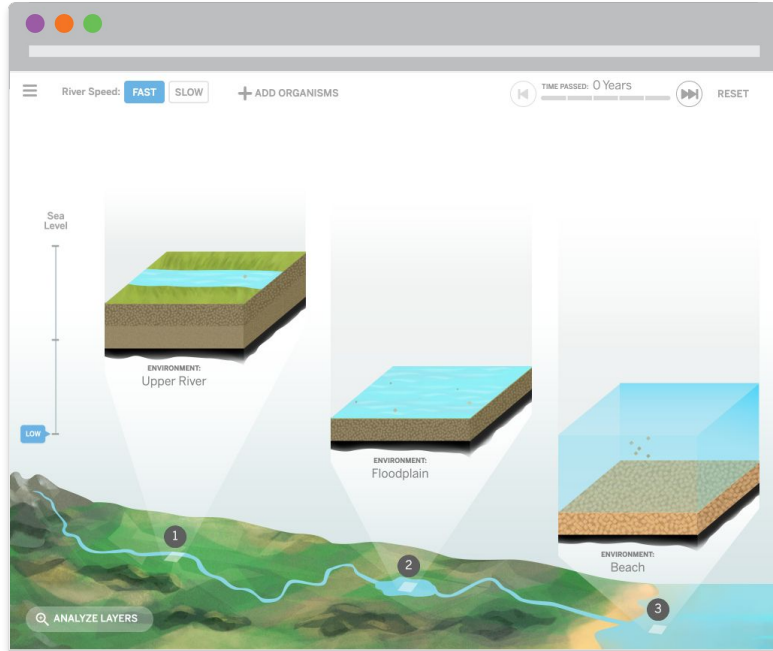
Step 2

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

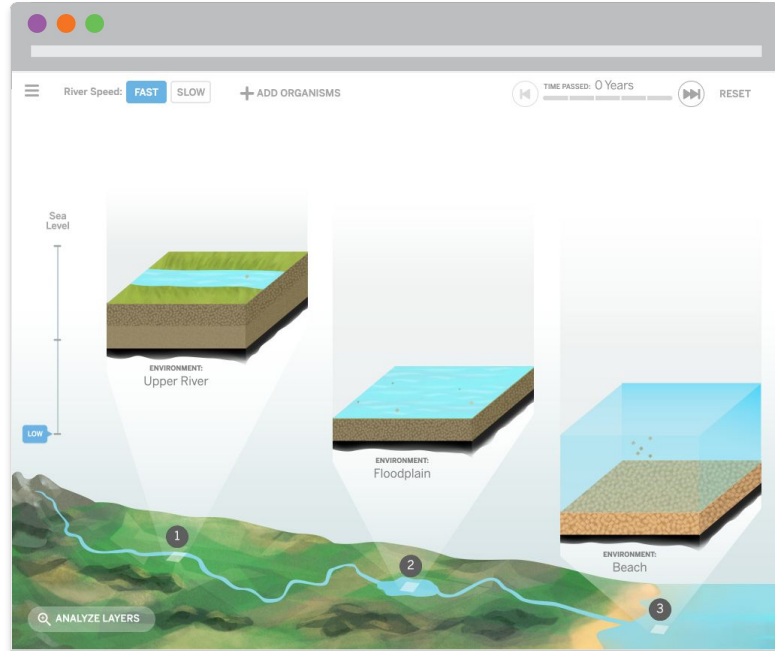


Step 3

Click on the **orange box with a 1** to access the Sim.



Investigate fossils in the Sim and **record** your observations on page 9 in your notebooks.



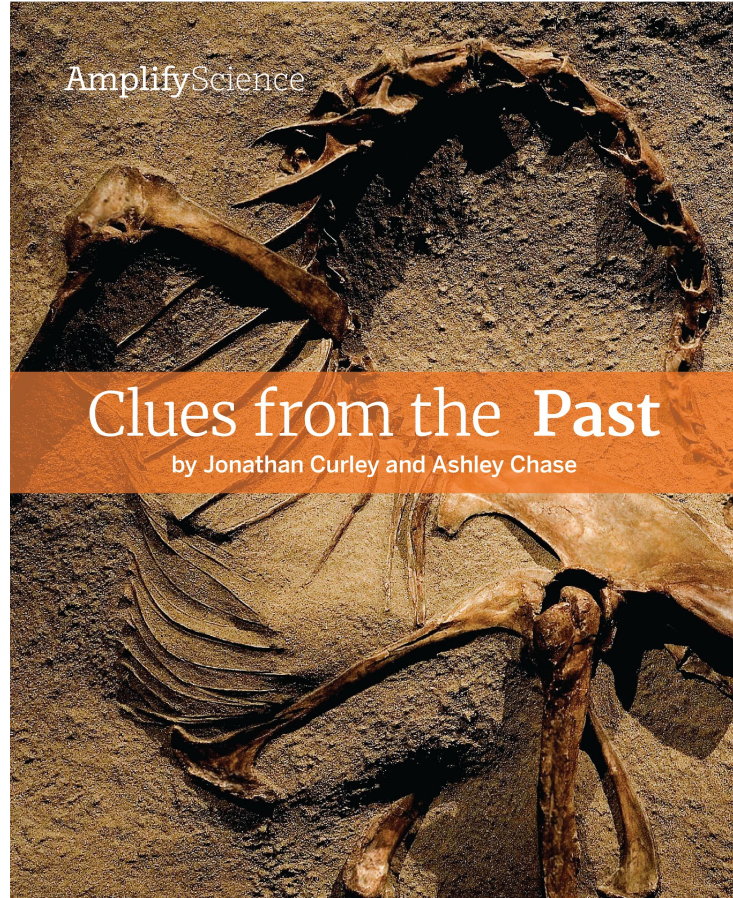
What did you observe in the Sim?

In the Sim, I observed _____.

Activity 3

Discussing Fossils





Scientists can gather information from models and books. You will **reread** part of *Clues from the Past* to get additional information about how fossils form.

Remember that sediment can cover organisms' bodies. As the sediment slowly turns to rock, the hard parts of organisms' bodies can get preserved in the rock. Over time, they become fossils. These fossils are stuck inside sedimentary rock layers.



The body of this small animal was trapped in sediment. It is now a fossil.



**Plants can form fossils, too.
This is a leaf fossil.**

Turn to pages 8–9.



**Look carefully at the
pictures and read
the text.**

Think-Pair-Share Routine



Think

Think silently about the question.



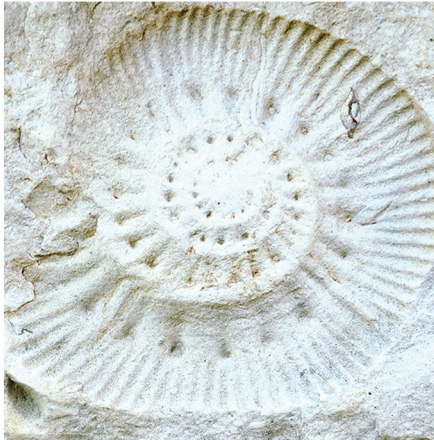
Pair

Turn and talk to a partner about the question.



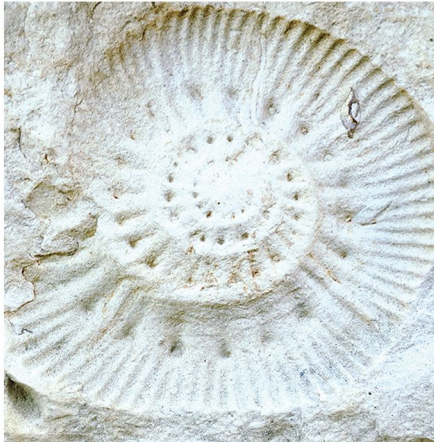
Share

Share your ideas about the question with the class.



What was one **new idea** you learned about fossils from reading *Clues from the Past* that you didn't observe in the Sim?

One new idea I learned about fossils is _____.



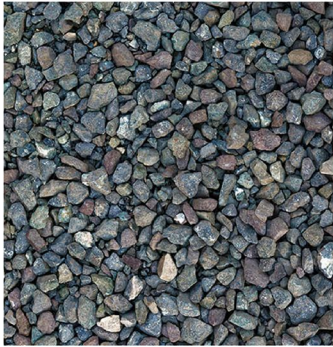
What always **needs to happen for a fossil to form**? Think about what you observed in the Sim and read in *Clues from the Past*.

For a fossil to form, _____.

Sediment Types



silt



gravel



sand

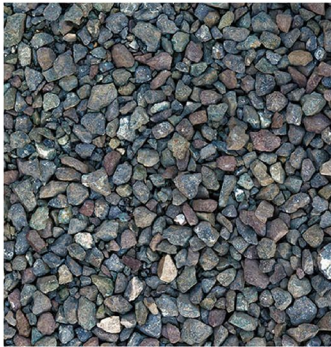
For organisms to turn into fossils, they first need to be covered with **sediment**.

There are many different kinds of sediment, and these are just a few.

Sediment Types



silt



gravel



sand



Observe these examples of sediment.

How is each type of sediment **different**?

_____ is different from _____ because _____.

Vocabulary



sediment

small pieces of rock, such as silt or sand

Activity 4

Reflecting on How Fossils Form





You will use what you have learned about **fossil formation** to explain how this fossil may have formed.

Name: _____ Date: _____

Reflective Writing: Fossils

Record a response to the question below. Think about the information you gathered from the Sim and *Clues from the Past* to help you answer the question.



How do you think this fossil formed?

Turn to page 10 in your notebooks.



Record your answer to the question on your notebook page.



How did this fossil **form**?

This fossil formed by _____.



Let's think back to the question we are investigating.



What have we learned about how fossils form?

We learned _____.

Key Concept

A fossil forms when an organism dies and is covered with sediment that turns into rock.

End of Lesson



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Amplify.

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Plan for the day

- Introduction and framing
- Writing in Amplify Science
 - Writing as part of a multimodal experience
 - Supporting students with writing
 - Writing a culminating explanation or argument
 - Additional supports
- Model Lesson
- Planning
- Closing

Planning for activities

Personalize Classroom Slides

What slides do not need to be visible to students?
How will these reflect the timing decision you made? Additions?
Personalized language?

Digital Tools

How will students navigate? What might be challenging? What is the key take-away? Do you need to “check-out” devices? Review “Apps in this Unit.”

Hands-on materials

What will you need from the kit? How many will you use? What needs to be set-up in advance? Right before? After?

Work time: Planning

Navigate to a lesson that you'll be teaching in the upcoming weeks.

- **Identify the small writes in the lesson**
 - Analyze their purpose
 - What writing supports are embedded in the activity ?
 - Are there any additional supports you might provide?
- **Download the End-of-Unit Assessment**
 - What does each rubric assess?
 - How could the End-of-Unit help you unit planning and instruction throughout the whole unit

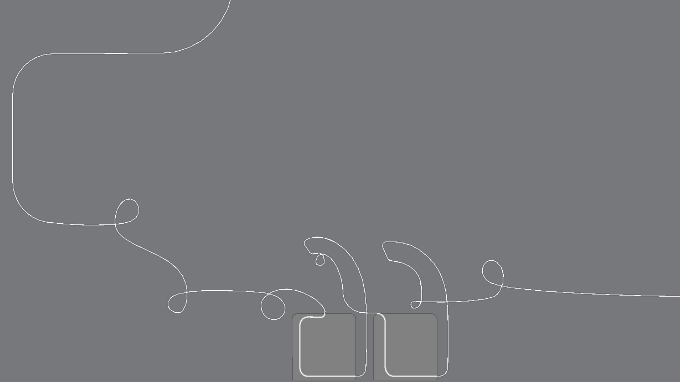


Share out

- Identify the small writes in the lesson
 - Analyze their purpose
 - What writing supports are embedded in the activity ?
 - Are there any additional supports you might provide?



Questions?





Plan for the day

- Introduction and framing
- Writing in Amplify Science
 - Writing as part of a multimodal experience
 - Supporting students with writing
 - Writing a culminating explanation or argument
 - Additional supports
- Model Lesson
- Planning
- Closing

Overarching goals

- ☑ Identify specific characteristics and genres unique to science writing
- ☑ Describe how the Amplify Science writing approach supports students to engage in science practices, make sense of science ideas, and develop as writers
- ☑ Be ready to teach specific writing activities in an Amplify Science unit

Let's connect
this goal to
our students

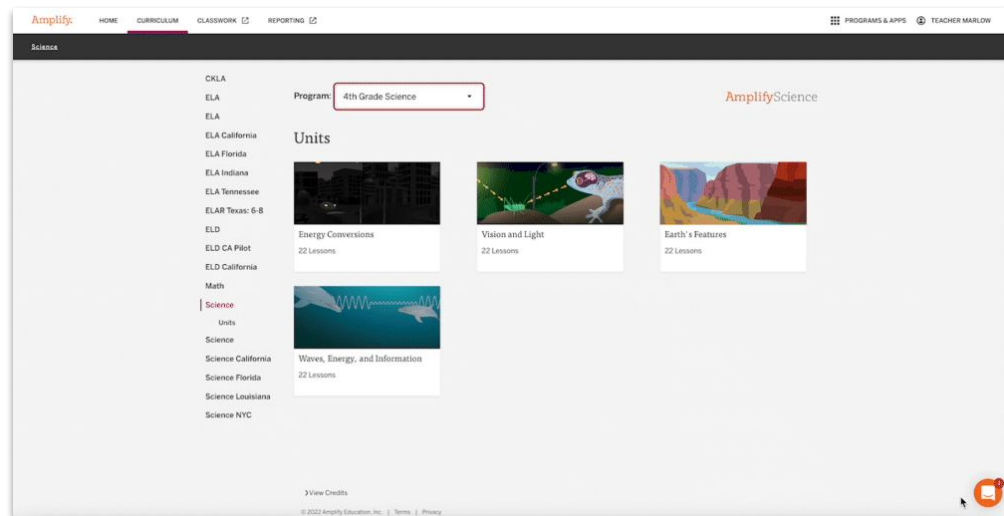


Additional resources and ongoing support

Seek information specific to enrollment and rosters, technical support, materials and kits, and teaching support.



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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



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Closing reflection

Based on our work today in Part 2, share:

Head: something you'll keep in mind

Heart: something you're feeling

Feet: something you're planning to do