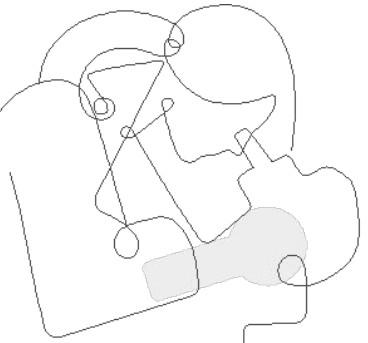
Amplify Science

Unit Internalization / Guided Planning

Grade 4, Unit 3: Earth's Features

Part 1



School/District Name: LAUSD
Date:
Presented by:

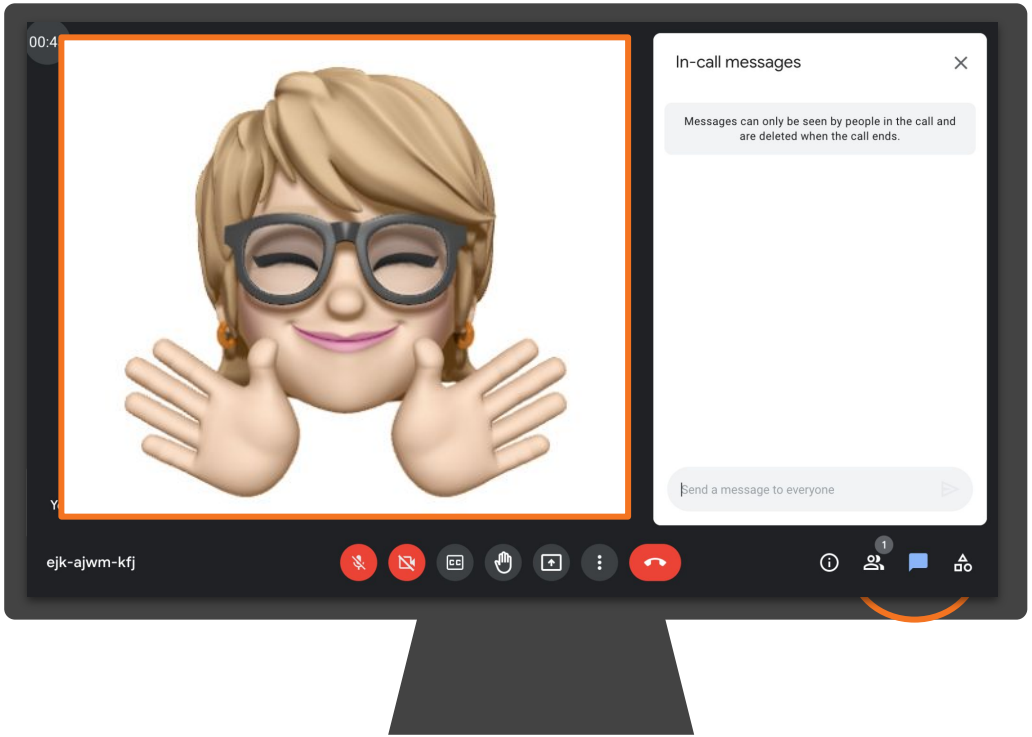
TOP RATED BY EDREPORTS

PLPG CERTIFIED PROVIDER

Ice Breaker!

Who do we have in the room today?

- Share your experience with Amplify Science so far.



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.

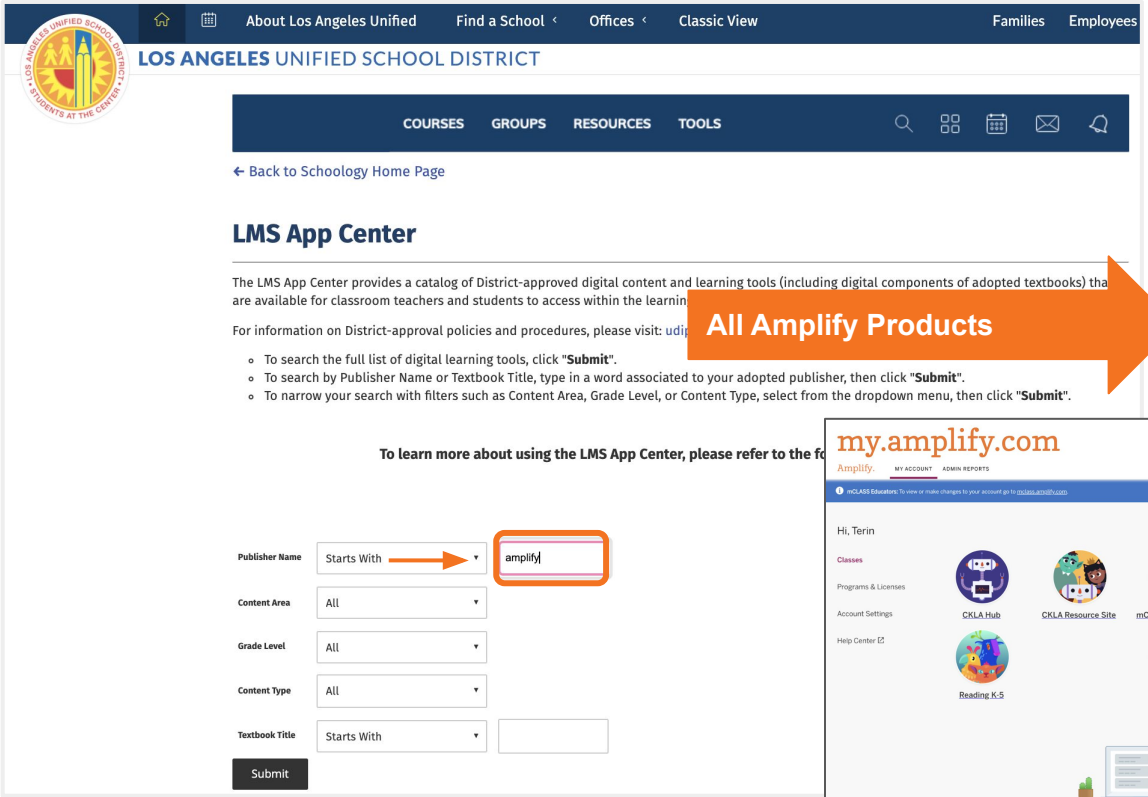
We share your goal of **inspiring all students to think deeply, creatively, and for themselves.**

Sincerely,
Amplify

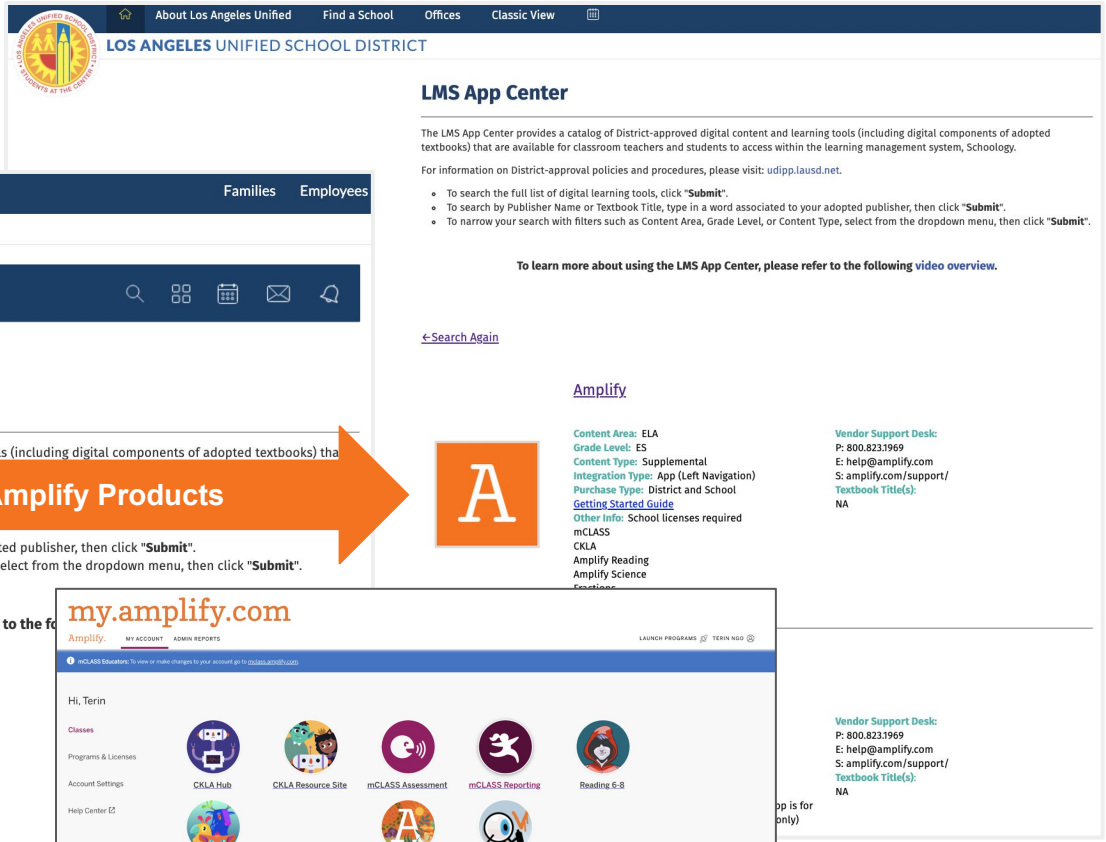
Norms: Establishing a culture of learners

- **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.

Schoology



All Amplify Products



my.amplify.com

Amplify. MY ACCOUNT ADMIN REPORTS LAUNCH PROGRAMS TERIN NGO

mCLASS Educators: To view or make changes to your account go to mclass.amplify.com.

Hi, Terin

Classes

Programs & Licenses

Account Settings

Help Center

CKLA Hub

CKLA Resource Site

mCLASS Assessment

mCLASS Reporting

Reading 6-8

Reading K-5

Science

Vocabulary

Amplify. on Schoology

2021-2022

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.

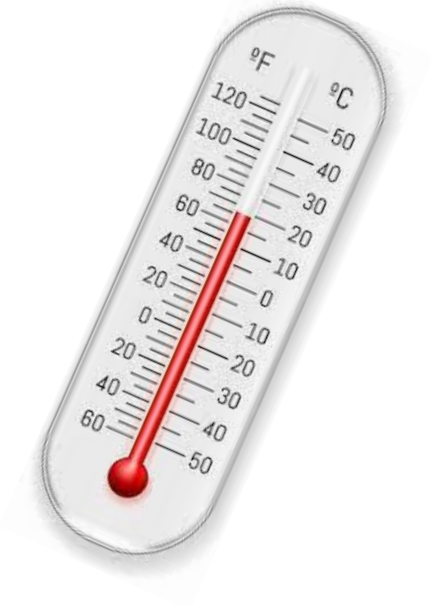
1 = Extremely Uncomfortable

2 = Uncomfortable

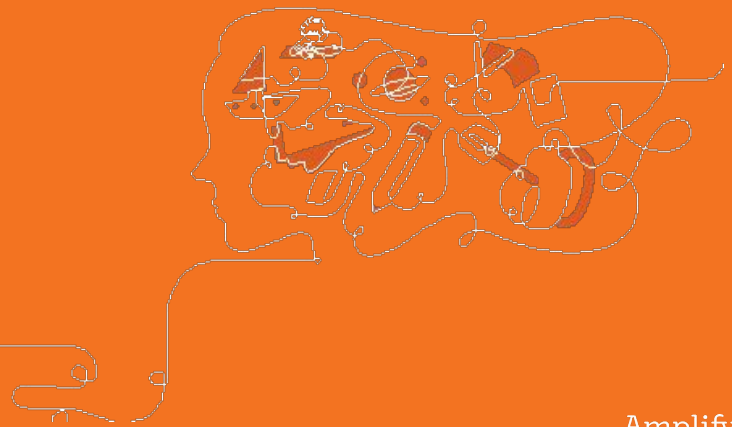
3 = Mild

4 = Comfortable

5 = Extremely Comfortable



Part 1



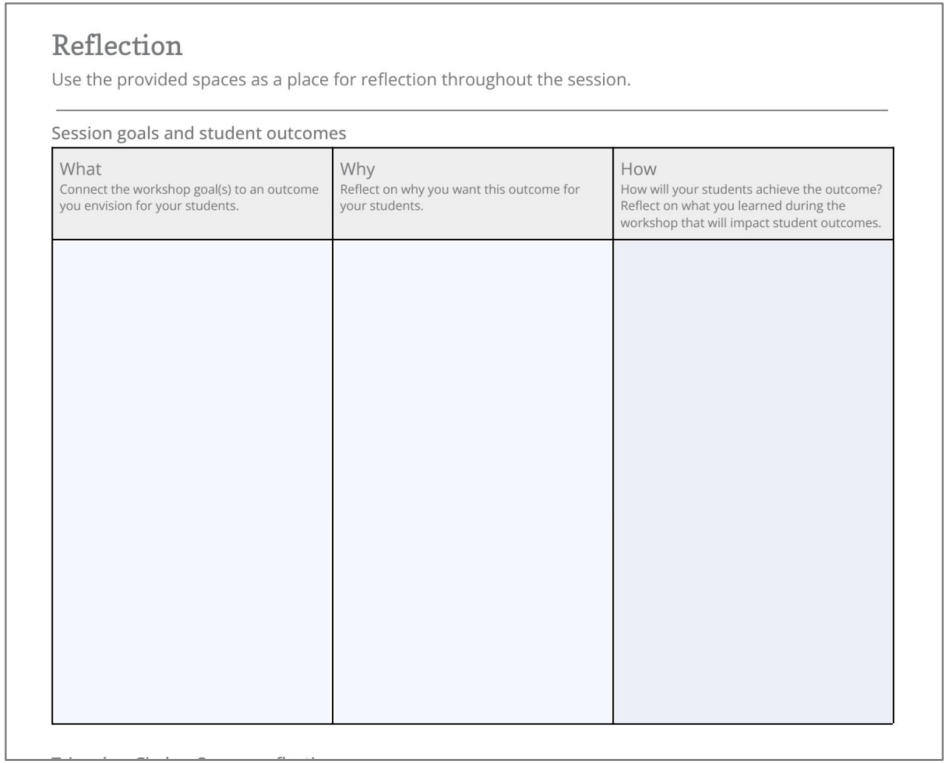
Overarching goals

- ❏ Explain how students engage in phenomenon based and 3D learning to construct an understanding of the science concepts introduced in *Earth's Features.*
- ❏ Internalize the unit and apply your new understanding to plan for the diverse needs of your classroom and students

Opening Reflection

What are your goals
for student outcomes?

Participant Notebook

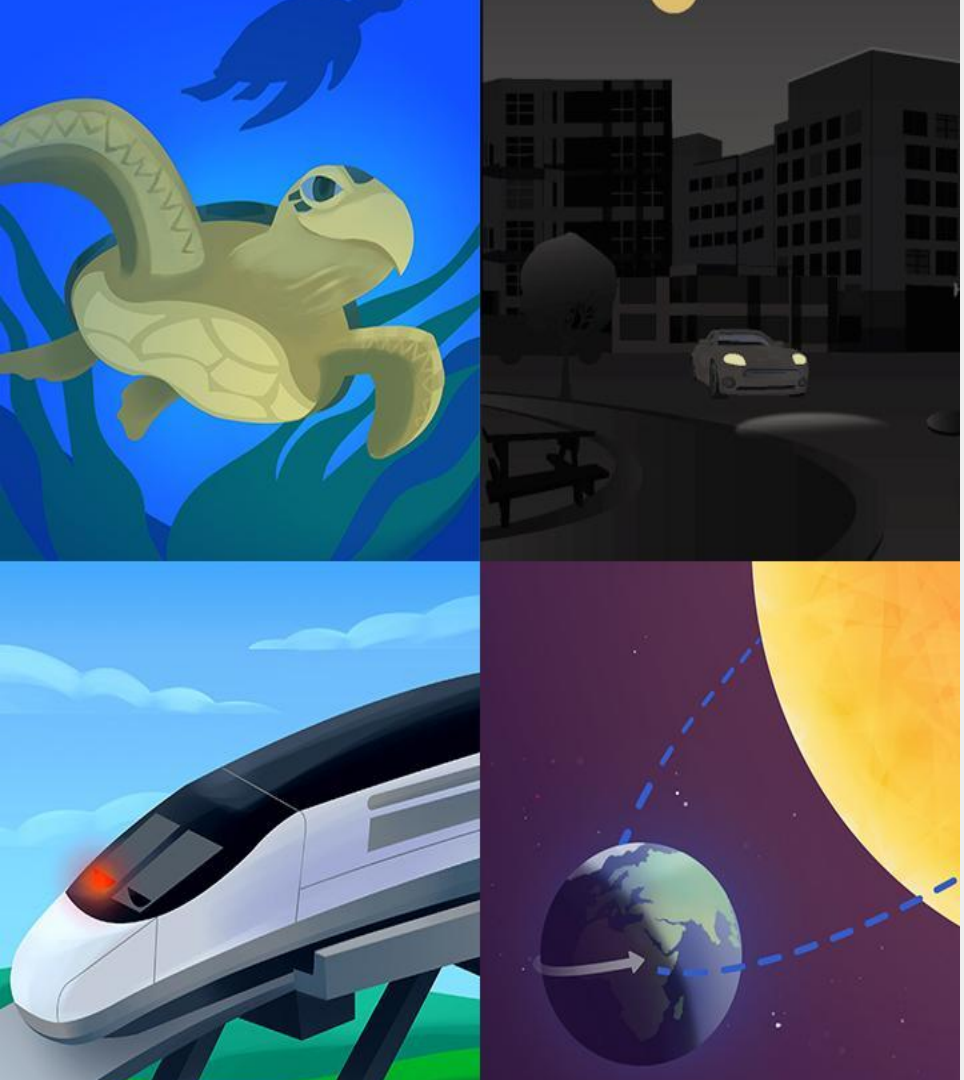


Reflection

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

Session goals and student outcomes

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



Plan for the day: Part 1

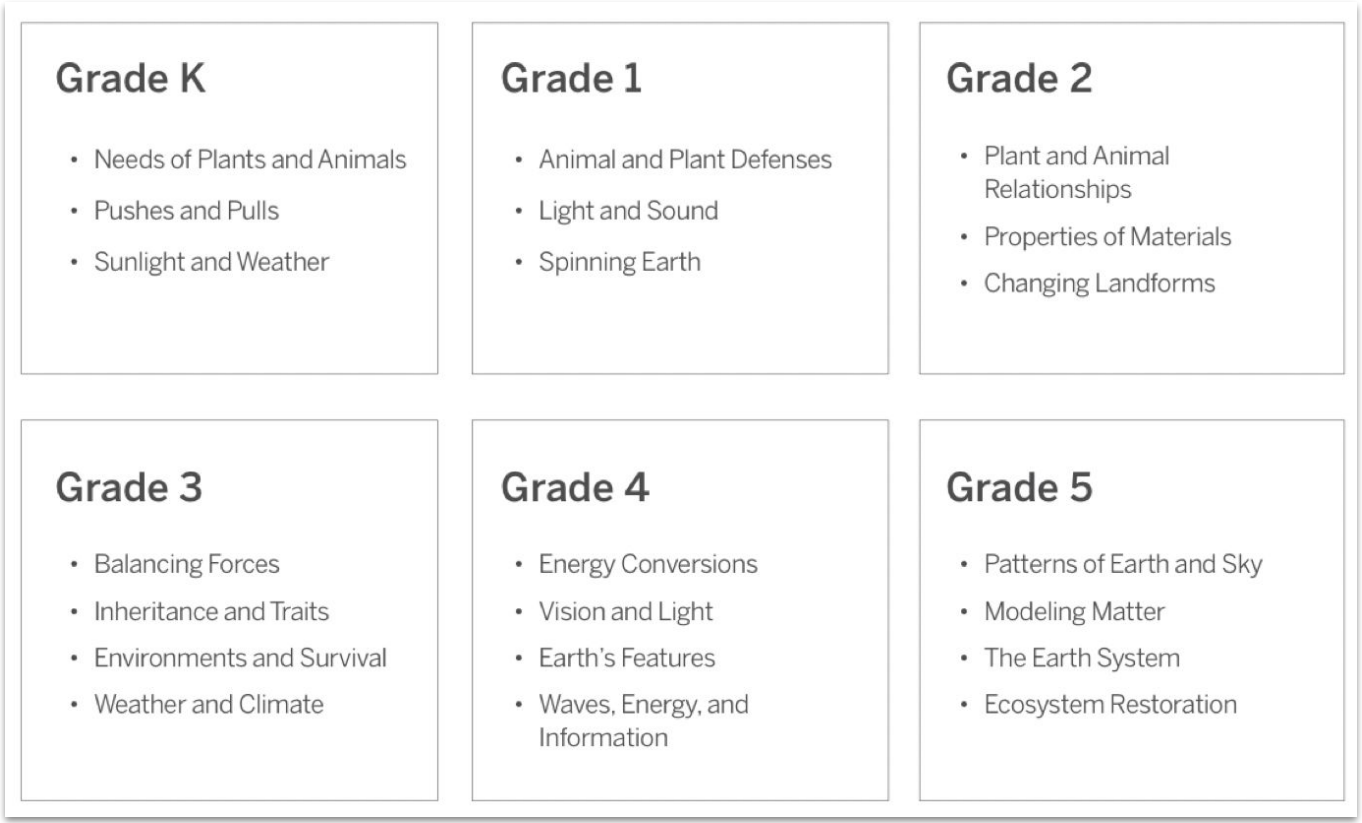
- Introduction and Framing
- NGSS & 3D Learning
- Phenomenon-based Instruction
- Unit Internalization
- Additional Resources
- Closing

THE LAWRENCE HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

+ Amplify.

Amplify Science

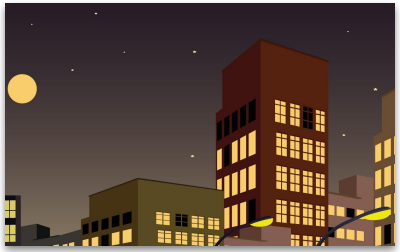
Course curriculum structure



Key takeaways:

- There are 22 lessons per unit
- Lessons at grades 2-5 are 60 minutes long

Year at a Glance: Grade 4

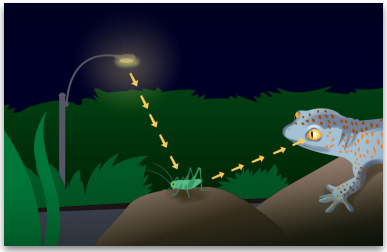


Energy Conversions

Domain: Physical Science

Unit type: Engineering Design

Student role: System engineers



Vision and Light

Domain: Life Science

Unit type: Investigation

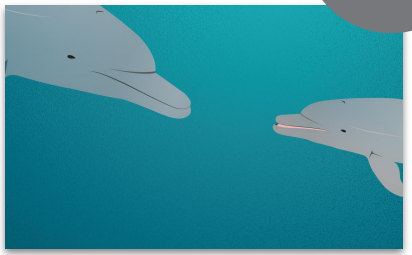
Student role: Conservation biologists

Earth's Features

Domain: Earth and Space Science

Unit type: Argumentation

Student role: Geologists



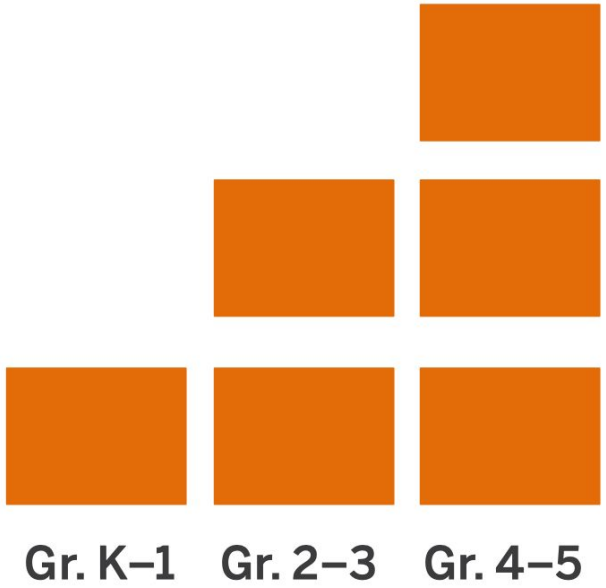
Waves, Energy, and Information

Domain: Physical Science

Unit type: Modeling

Student role: Marine scientists

What are the digital components of Amplify Science Elementary?



Student Simulations

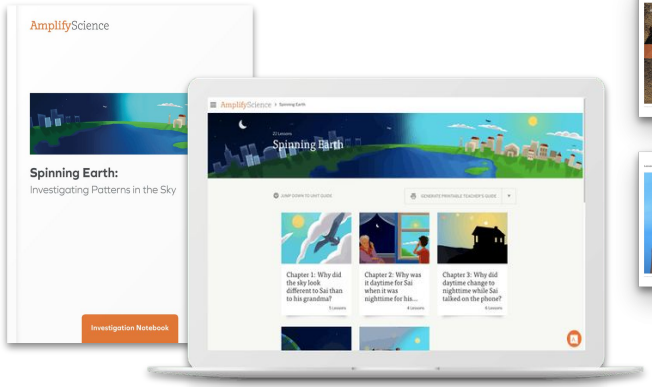
Student Science Practice Tools
(sorting tool, diagramming tool, modeling tool, data tool)

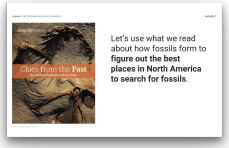
Teacher's Guide
(Online digital books for students)

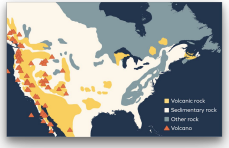
K-5 Program components

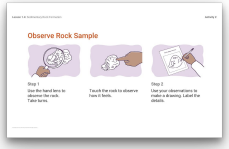
Teacher materials

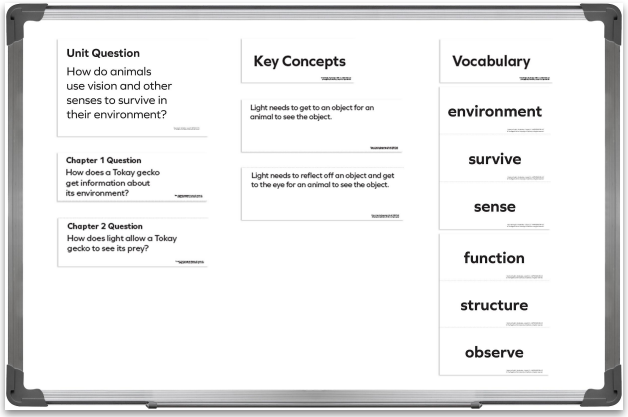
- Teacher's Guide (print and digital)
- Classroom Slides
- Classroom wall materials
- Embedded assessments
- Program Guide
- Program Hub
- Amplify Help Site







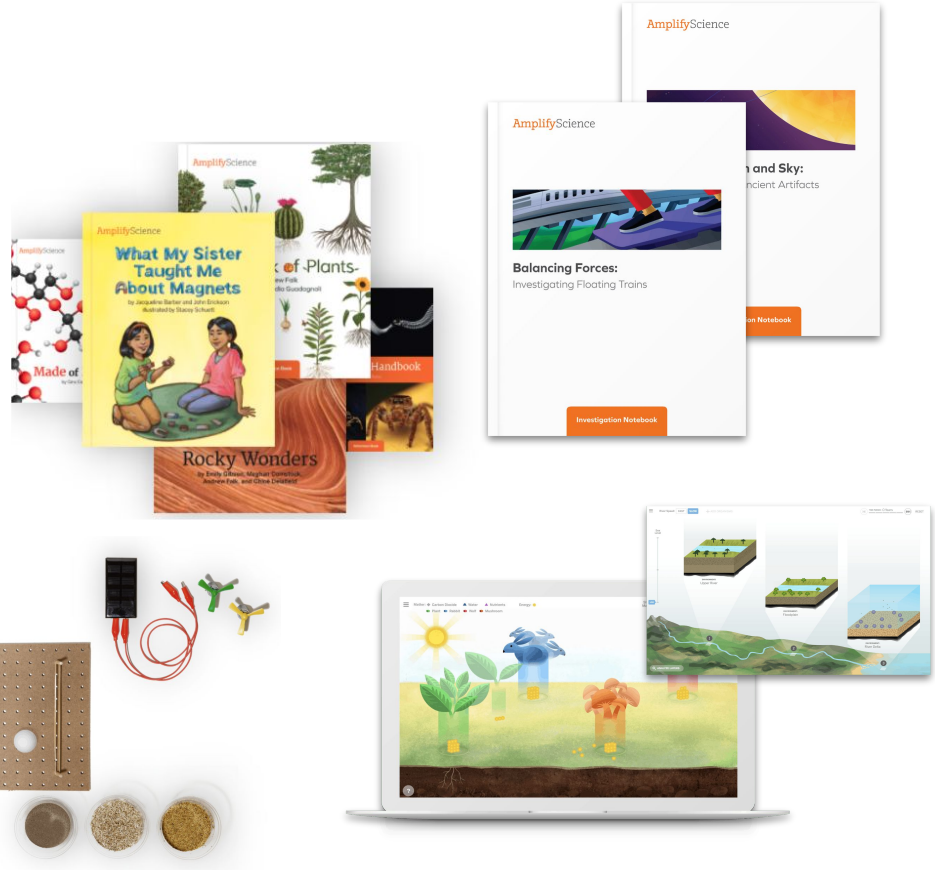




K-5 Program components

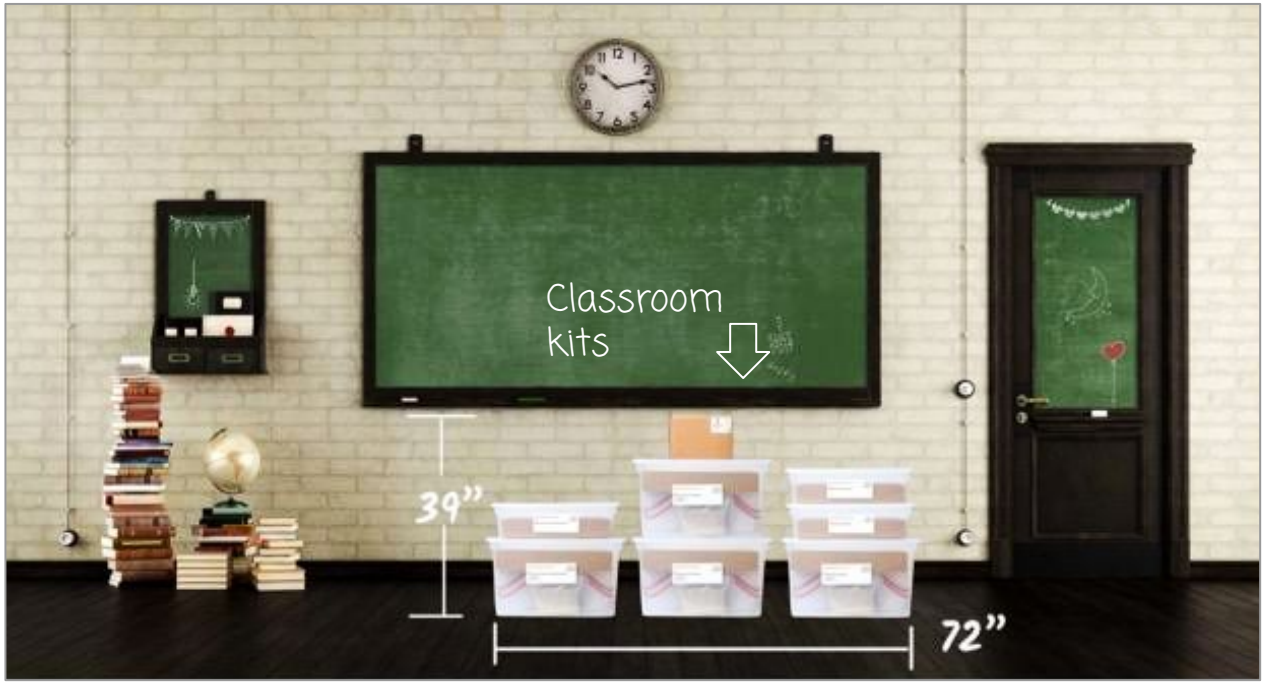
Student materials

- Hands-on materials
- Investigation Notebooks (print and digital)
- Student books
- Digital Applications



K-5 Program components

Classroom kits

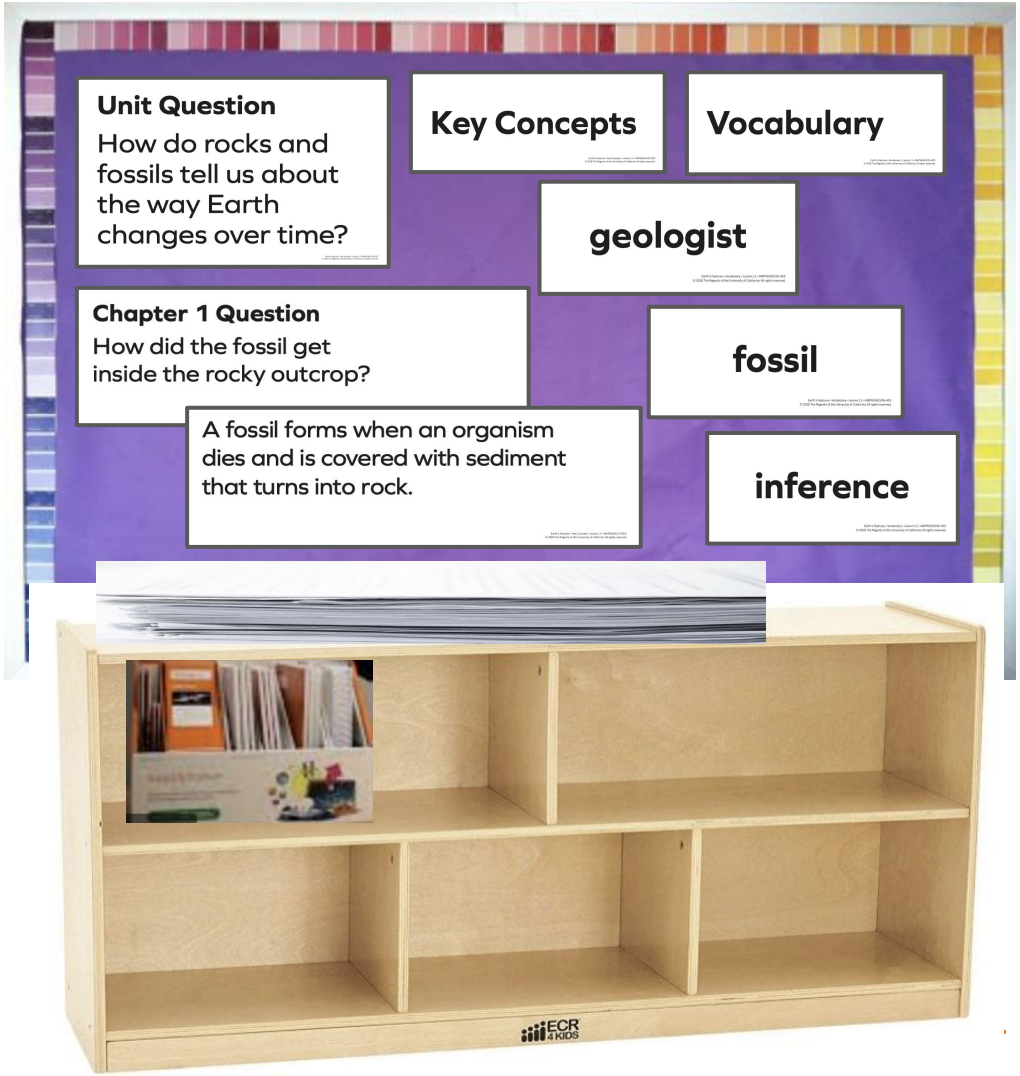


Classroom kits

Built for a class of 36 students, with consumables for two years

Unpacking the Kit

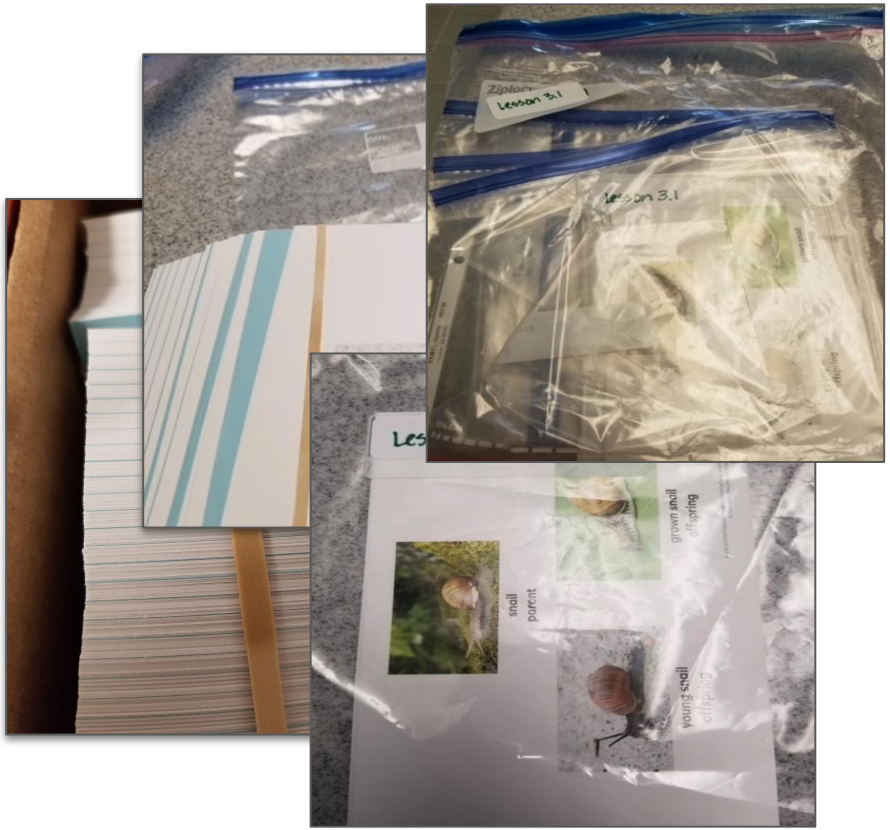
- Pull out the unit question, key concepts and vocabulary materials.
- Place them on the top of the table or bookcase below your science board
- Take books out of kit and place in the bookcase or on the table. (Always collect books after each lesson use. Return to bookcase so they are easily accessible.)



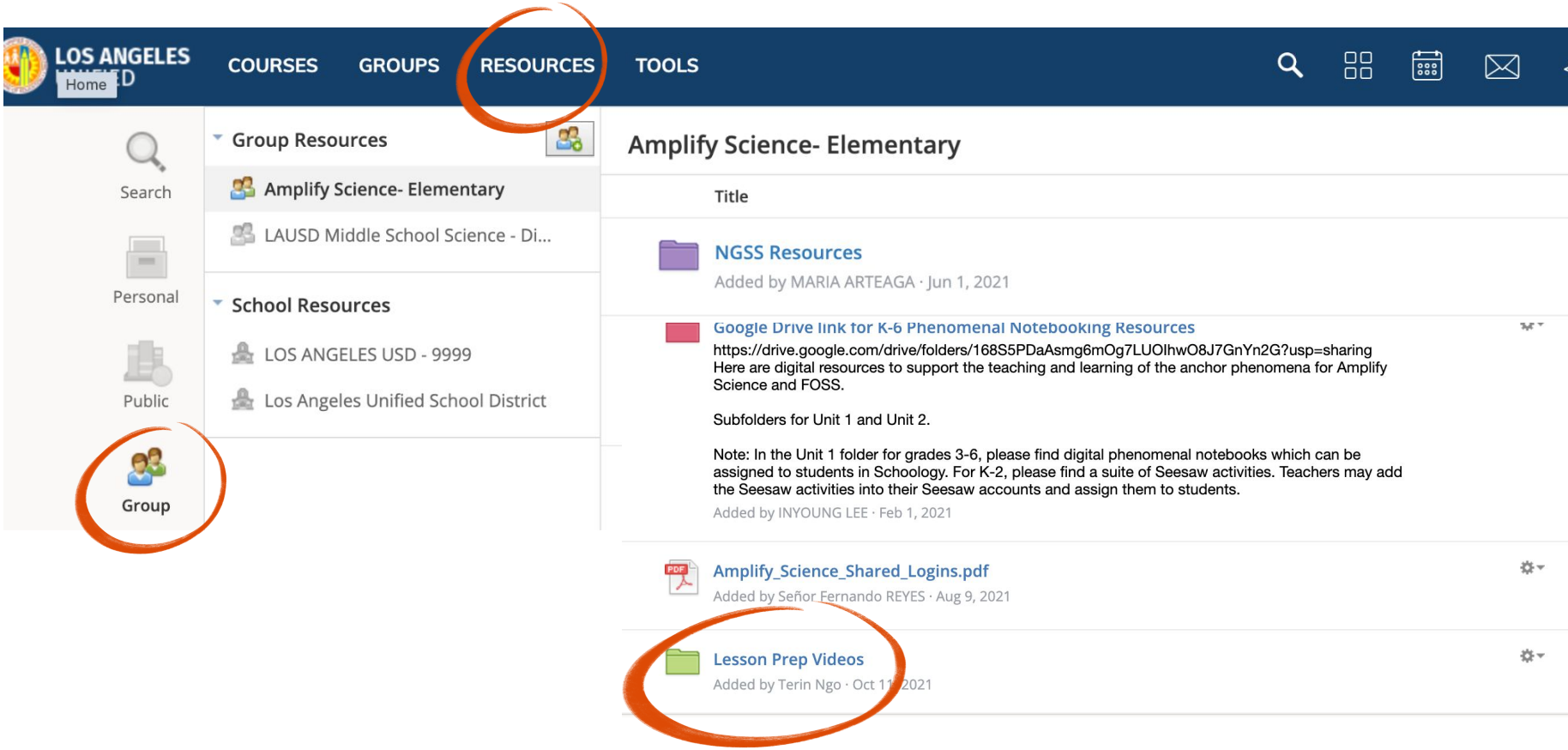
Cards for games, sorting or matching activities

Organization tips:

- Separate and place in envelopes or bags (or clip together)
- Label the envelopes or bags with the name and lesson # and activity # (ex. Lesson 2.4, Act. 1)
- Put each envelope or bag (1 set) into a bigger bag and label



LAUSD Schoology: Unit 1, 3-5 Lesson Prep Videos



LAUSD Microsite- https://amplify.com/laus

Welcome to Amplify Science!

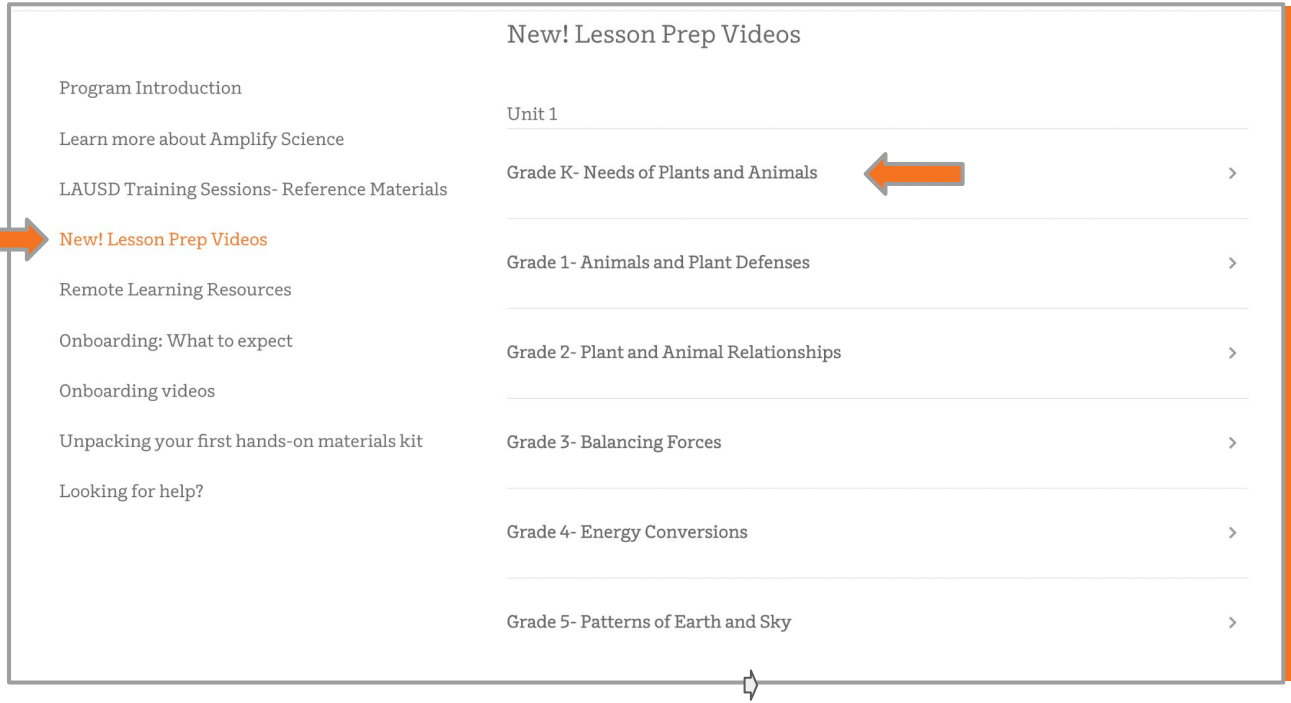
This site contains supporting resources designed for the LAUSD Amplify Science adoption for grades TK–8.

- 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!

Microsite: Unit 1, K-2 Lesson Prep Videos

Classroom kits



Classroom Kits

Built for a class of 36 students, with consumables for two years

Hands On Material Organization

Directions

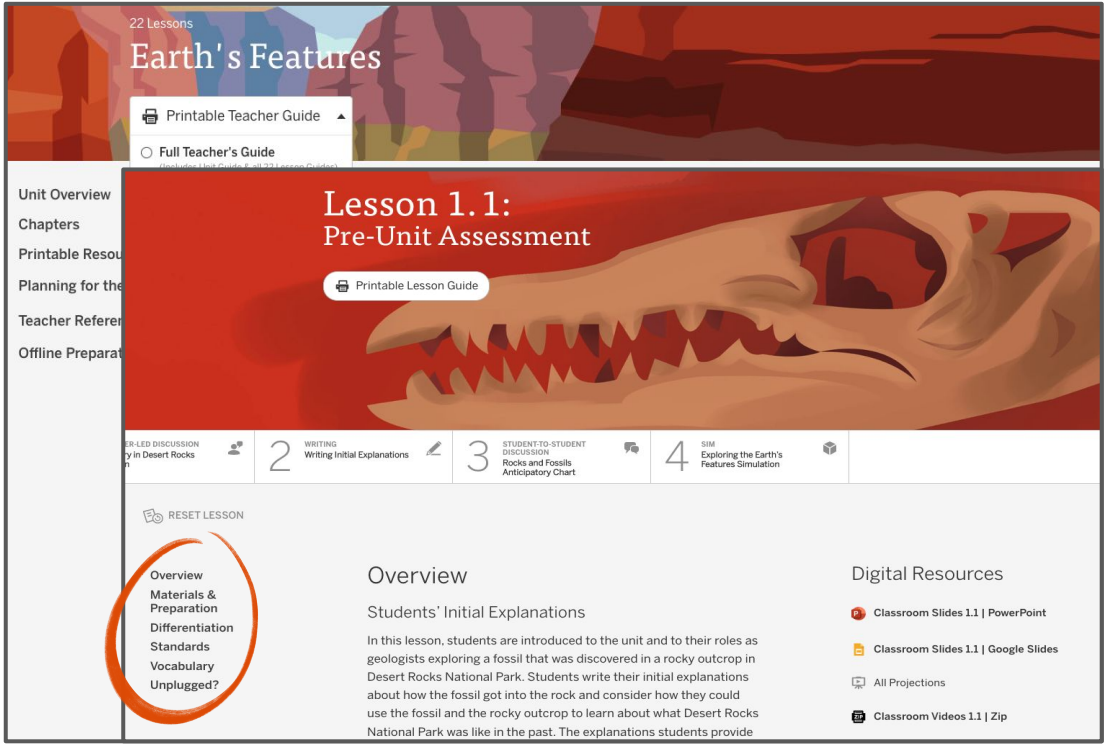
1. Open the Digital Lesson Guides Only page 7 from the Unit Landing page or go the Print TE to page 31. (Chapter 1 Activities)
2. Look for the lessons with Hands On.

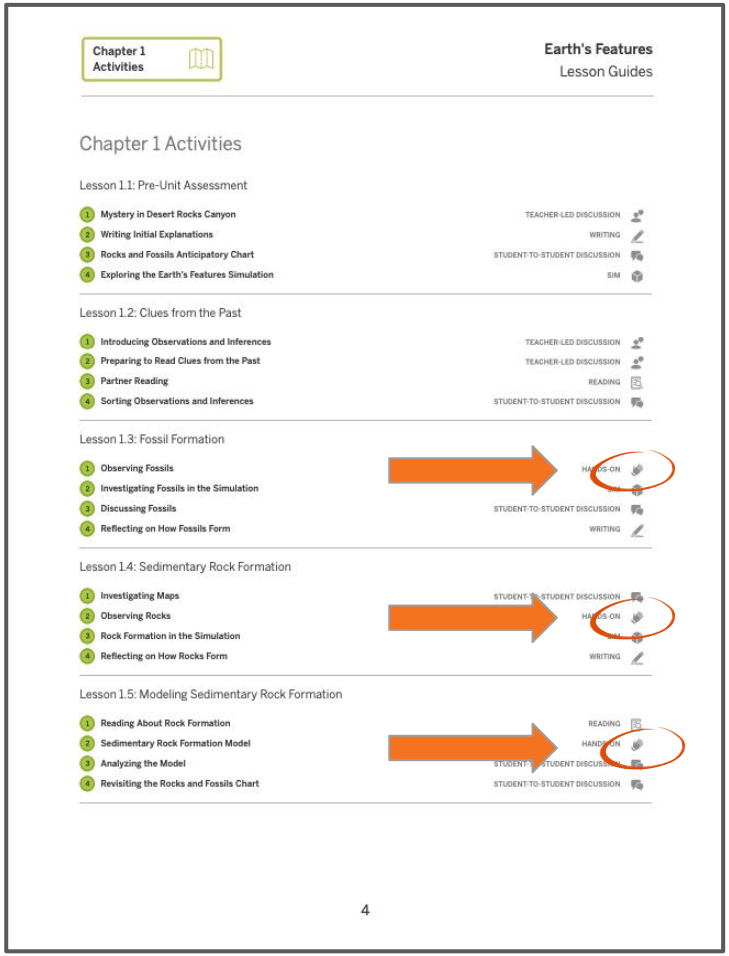
HANDS-ON

3. Note in the table below.
4. Review the materials and preparation to determine if it can be prepared prior to the lesson or on the day of the lesson.
5. Use this same procedure for each Chapter. (Go to the Chapter Activities Contents)

Chapter/Lesson	Activity	Prep Prior	Prep Day of	What to do	
1.1	1	X		Prep plastic bags with labels A, B, C, D and M. Place 1 tsp of the following cinnamon, salt, flour, cornstarch in A,B,C, D. In bag M mix 1 tsp salt and 1 tsp cinnamon.	*This is an example from Properties of Materials Grade 2*

- Open Your **Lesson Guides Only**
- Start with **Chapter 1** and look for the **hands icon**
- Go into the lesson **materials and prep**





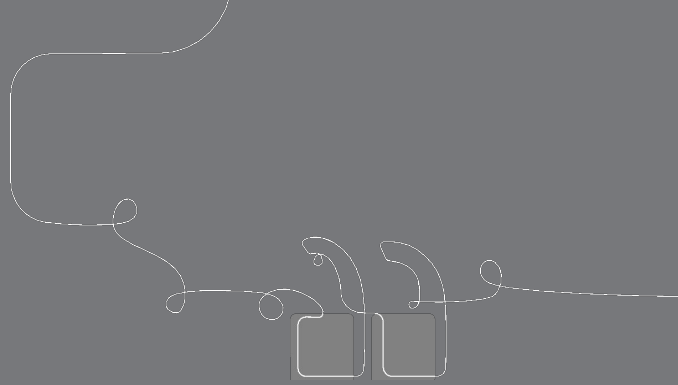
Hands On Material Organization

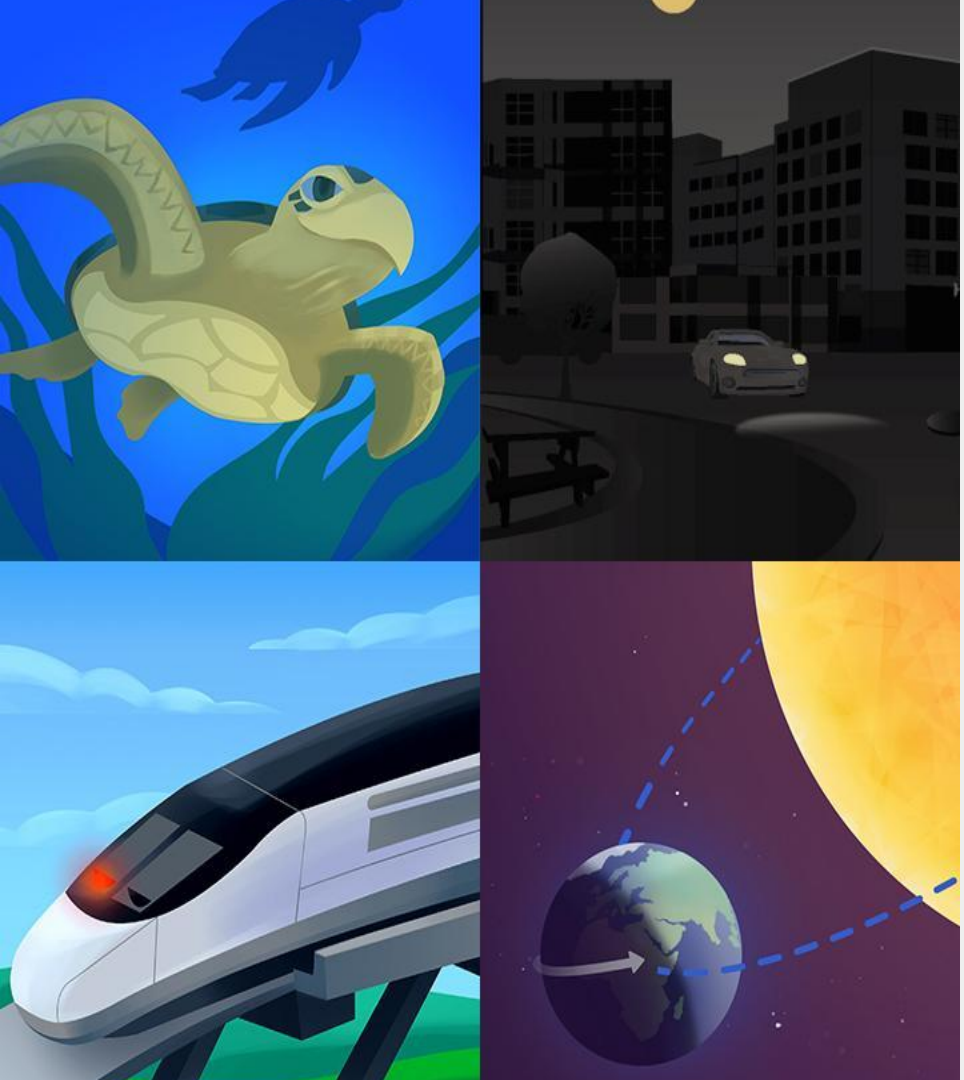
Completed for Earth's Features

2	1. Open the Digital Lesson Guides Only page 7 from the Unit Landing page or go the Print TE to page 31. (Chapter 1 Activities)					
3	2. Look for the lessons with Hands On.					
4	HANDS-ON					
5	3. Note in the table below.					
6	4. Review the materials and preparation to determine if it can be prepared prior to the lesson or on the day of the lesson.					
7	5. Use this same procedure for each Chapter. (Go to the Chapter Activities Contents)					
8						
9	Chapter/Lesson	Activity	Prep Prior	Prep Day of	What to do	
10	1.1	1	X		Prep plastic bags with labels A, B, C, D and M. Place 1 tsp of the following cinnamon, salt, flour, cornstarch in A,B,C, D. In bag M mix 1 tsp salt and 1 tsp cinnamon.	*This is an example from Properties of Materials Grade 2*
11	1.3	1	X		Clip Fossil Cards sets together, *1 Hand Lens/pair of students	*Teacher Provided
12	1.4	2	X		Fossil cards and hand lenses form L. 1.1	
13	1.5	2	X		*Teacher provided: plastic trays (or paper plates), newspaper, paper towels, a pitcher, a wooden spoon, 6 cups of water, a measuring cup, a permanent marker, and pens or pencils. Prepare of Trays of materials: 1 lg (16 oz.) cup with approx. 1/3 cup gravel, 1 lg cup with approx. 1/3 cup sand, 1 empty lg. cup (to be filled iwth 1/3 cup plaster-water mixture in Act. 2, 4empty small (3 oz.) cups: 2 for making the models in and 2 for placing inside of the model to drain excess water w/o pouring out sediment, 2 plastic spoons, 2 sheets of newspaper, 2 paper towels, 2 pieces of masking tape, 1 pencil or pen. Prepare materials for the plaster-water mixture (to be mixed during Act. 2 so it doesn't solidify): lg cup with 1 1/4 cups plaster, pitcher filled with 3 cups of water, wooden spoon Materials fo Class Sedimentary Rock Formation Model (Act. 3): 3 lg cups, gravel, plaster, water, 1 plastic spoon-Create a small amount of plaster-water mixture by mixing 3 spoonfuls of plaster with about ⅓ cup water in a large cup. Wipe off the spoon. Using the plastic spoon, add 5 spoonfuls of gravel to a clean large cup. Then, add just enough plaster-water mixture to cover the top of the gravel in the cup. Mix the gravel and plaster-water with a spoon and then let the gravel settle. Using the bottom of the third large cup, press down on the gravel mixture. Pour out any excess plaster-water mixture from the model into the cup with the plaster-water mixture. Set aside the model to allow the plaster to harden. Discard excess plaster-water mixture and rinse cup and spoons.	
14	1.5			X	Write the Investigation Question on the board: *"How does sedimentary rock form?"* Materials from above	

Sheet1

Questions?





Plan for the day: Part 1

- Introduction and Framing
- NGSS & 3D Learning
- Phenomenon-based Instruction
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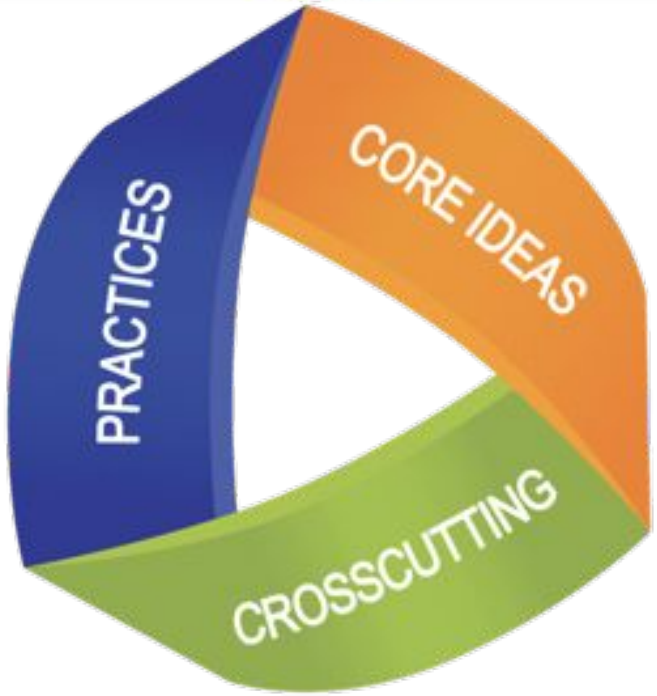
Next Generation Science Standards

Three dimensional learning

Evaluate your knowledge

- On a scale of 0-5, how would you rate your familiarity with 3-D learning?



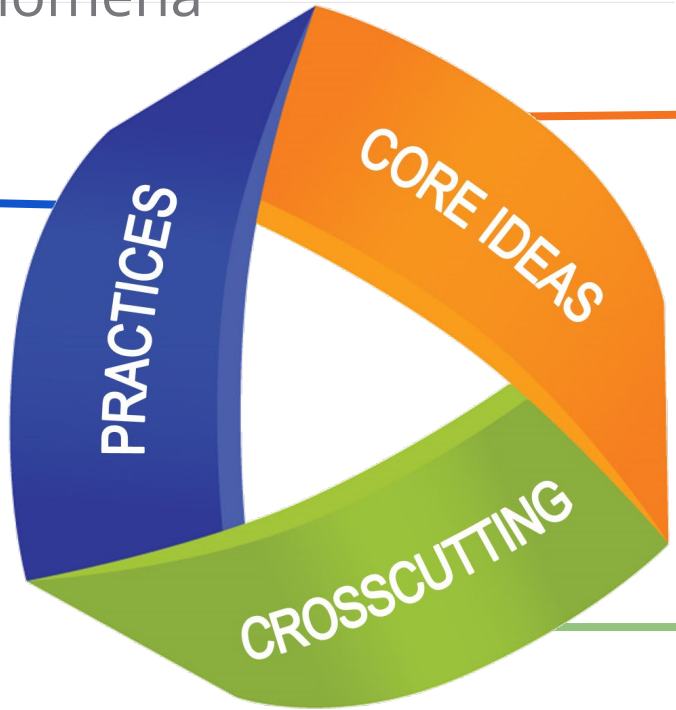
Conceptual Shifts in NGSS

1. K-12 Science Education Should Reflect the Interconnected Nature of Science as it is Practiced and Experienced in the Real World.
2. The Next Generation Science Standards are student performance expectations – NOT curriculum.
3. The science concepts in the NGSS build coherently from K-12.
4. The NGSS Focus on Deeper Understanding of Content as well as Application of Content.
5. Science and Engineering are Integrated in the NGSS from K–12.
6. The NGSS are designed to prepare students for college, career, and citizenship.
7. The NGSS and Common Core State Standards (Mathematics and English Language Arts) are Aligned.

Using 3-D teaching and learning

for figuring out phenomena

What scientists do
Science and Engineering Practices



What scientists want to know
Disciplinary Core Ideas

How scientists think
Crosscutting Concepts

Three dimensions of NGSS (CA) at a glance

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
SEP-1. Asking questions and defining problems SEP-2. Developing and using models SEP-3. Planning and carrying out investigations SEP-4. Analyzing and interpreting data SEP-5. Using mathematics and computational thinking SEP-6. Constructing explanations (for science) and designing solutions (for engineering) SEP-7. Engaging in argument from evidence SEP-8. Obtaining, evaluating, and communicating information	**Physical Science** PS1: Matter and its interactions PS2: Motion and stability: Forces and interactions PS3: Energy PS4: Waves and their applications in technologies for information transfer **Life Science** LS1: From molecules to organisms: Structures and processes LS2: Ecosystems: Interactions energy, and dynamics LS3: Heredity: Inheritance and variation of traits LS4: Biological evolution: Unity and diversity **Earth and Space Science** ESS1: Earth's place in the universe ESS2: Earth's systems ESS3: Earth and human activity **Engineering, Technology, and Applications of Science** ETS1: Engineering Design ETS2: Links among engineering, technology, science, and society	CCC-1. Patterns CCC-2. Cause and effect: Mechanism and explanation CCC-3. Scale, proportion, and quantity CCC-4. Systems and system models CCC-5. Energy and matter: Flows, cycles, and conservation CCC-6. Structure and function CCC-7. Stability and Change

An Analogy between NGSS and a Cake

Baking a cake
(performance expectations)

Baking Tools and Techniques (Science & Engineering Practices)

Science and Engineering Practices

inquiry

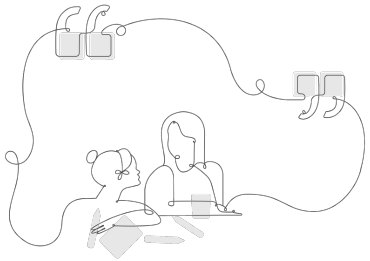
1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data

math

5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)

language

7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information



An Analogy between NGSS and a Cake

Baking a cake
(performance expectations)

Baking Tools and Techniques (Science & Engineering Practices)

Cake (Disciplinary Core Ideas)

Disciplinary Core Ideas

Pg. 7,8

Life Science	Physical Science
LS1: From Molecules to Organisms: Structures and Processes LS2: Ecosystems: Interactions, Energy, and Dynamics LS3: Heredity: Inheritance and Variation of Traits LS4: Biological Evolution: Unity and Diversity	PS1: Matter and Its Interactions PS2: Motion and Stability: Forces and Interactions PS3: Energy PS4: Waves and Their Applications in Technologies for Information Transfer
Earth & Space Science	**Engineering & Technology**
ESS1: Earth's Place in the Universe ESS2: Earth's Systems ESS3: Earth and Human Activity	ETS1: Engineering Design ETS2: Links Among Engineering, Technology, Science, and Society

An Analogy between NGSS and a Cake

Baking a cake
(performance expectations)

Baking Tools and Techniques (Science & Engineering Practices)

Cake (Disciplinary Core Ideas)

Frosting (Crosscutting Concepts)

Crosscutting Concepts

5. Energy and Matter

Tracking energy and matter flows, into, out of, and within systems helps one understand their system's behavior.

6. Structure and Function

The way an object is shaped or structured determines many of its properties and functions.

7. Stability and Change

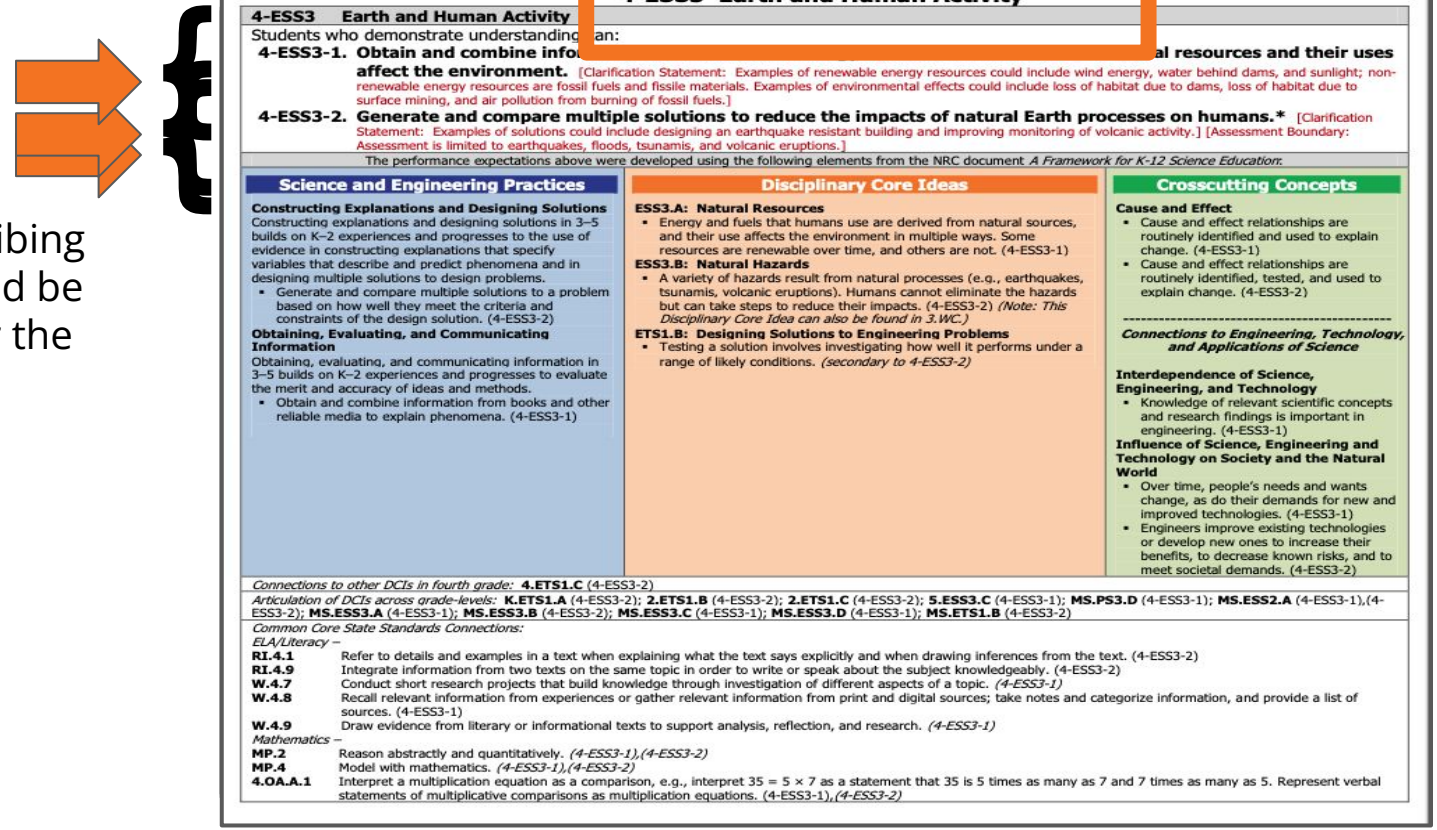
For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.

4. Systems and System Models

A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.

NGSS Standards, Grade 4

What is Assessed
a collection of **performance expectations** describing what students should be able to do to master the standard



4-ESS3 Earth and Human Activity

4-ESS3 Earth and Human Activity

Students who demonstrate understanding can:

4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.]

4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.* [Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.] [Assessment Boundary: Assessment is limited to earthquakes, floods, tsunamis, and volcanic eruptions.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-ESS3-2)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluate the merit and accuracy of ideas and methods.

- Obtain and combine information from books and other reliable media to explain phenomena. (4-ESS3-1)

Disciplinary Core Ideas

ESS3.A: Natural Resources

- Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (4-ESS3-1)

ESS3.B: Natural Hazards

- A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts. (4-ESS3-2) *(Note: This Disciplinary Core Idea can also be found in 3.WC.)*

ETS1.B: Designing Solutions to Engineering Problems

- Testing a solution involves investigating how well it performs under a range of likely conditions. *(secondary to 4-ESS3-2)*

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (4-ESS3-1)
- Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS3-2)

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Knowledge of relevant scientific concepts and research findings is important in engineering. (4-ESS3-1)

Influence of Science, Engineering and Technology on Society and the Natural World

- Over time, people's needs and wants change, as do their demands for new and improved technologies. (4-ESS3-1)
- Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to meet societal demands. (4-ESS3-2)

Connections to other DCIs in fourth grade: **4.ETS1.C** (4-ESS3-2)

Articulation of DCIs across grade-levels: **K.ETS1.A** (4-ESS3-2); **2.ETS1.B** (4-ESS3-2); **2.ETS1.C** (4-ESS3-2); **5.ESS3.C** (4-ESS3-1); **MS.PS3.D** (4-ESS3-1); **MS.ESS2.A** (4-ESS3-1),(4-ESS3-2); **MS.ESS3.A** (4-ESS3-1); **MS.ESS3.B** (4-ESS3-2); **MS.ESS3.C** (4-ESS3-1); **MS.ESS3.D** (4-ESS3-1); **MS.ETS1.B** (4-ESS3-2)

Common Core State Standards Connections:

ELA/Literacy –

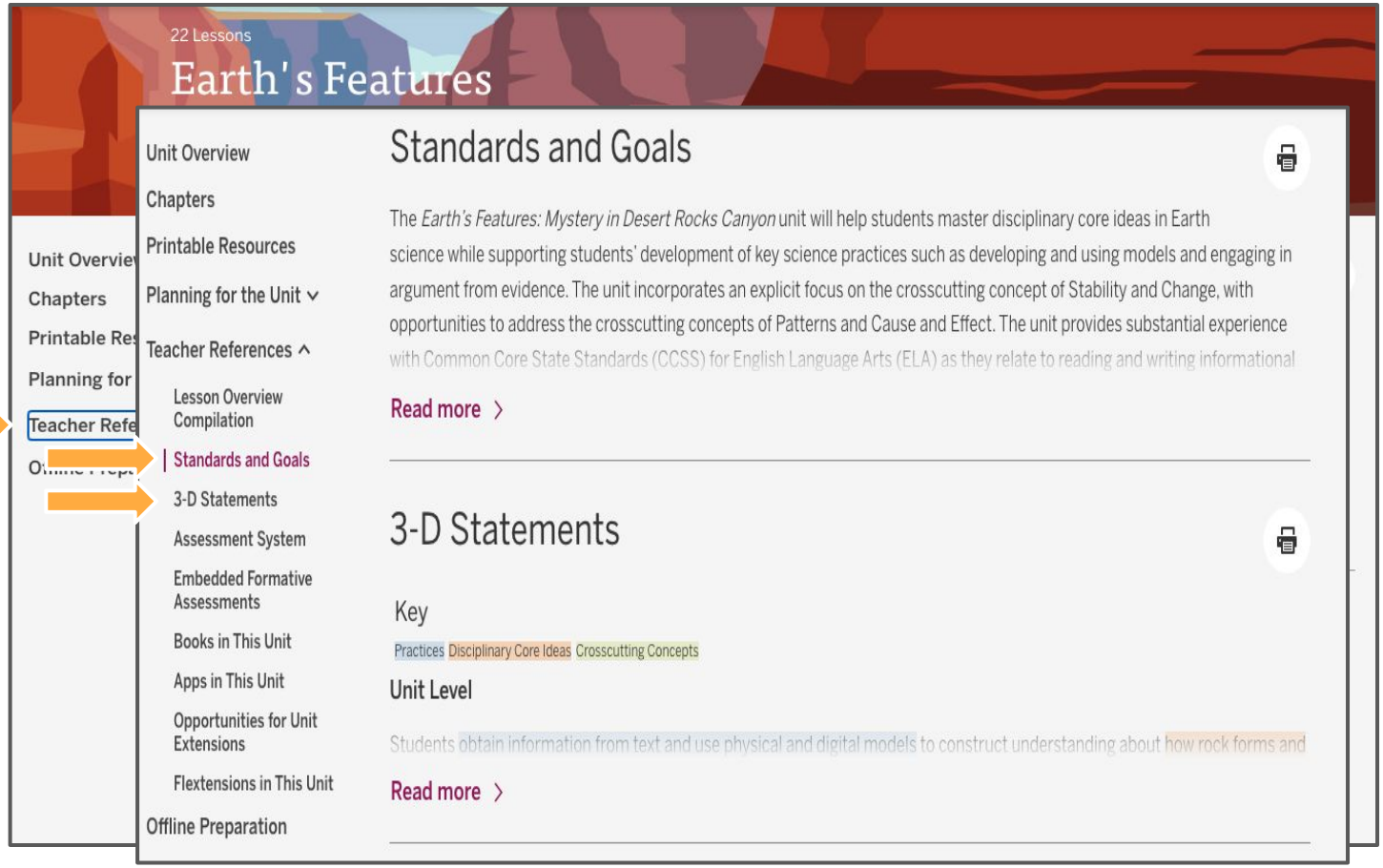
RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (4-ESS3-2)
RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-ESS3-2)
W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic. *(4-ESS3-1)*
W.4.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-ESS3-1)
W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. *(4-ESS3-1)*

Mathematics –

MP.2 Reason abstractly and quantitatively. *(4-ESS3-1),(4-ESS3-2)*
MP.4 Model with mathematics. *(4-ESS3-1),(4-ESS3-2)*
4.OA.A.1 Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. (4-ESS3-1),*(4-ESS3-2)*

Navigate to the Unit Landing Page

Review the **Standard and Goals** and the **3-D Statements**



Earth's Features: 3D Statements

Key

Practices Disciplinary Core Ideas Crosscutting Concepts

Unit Level

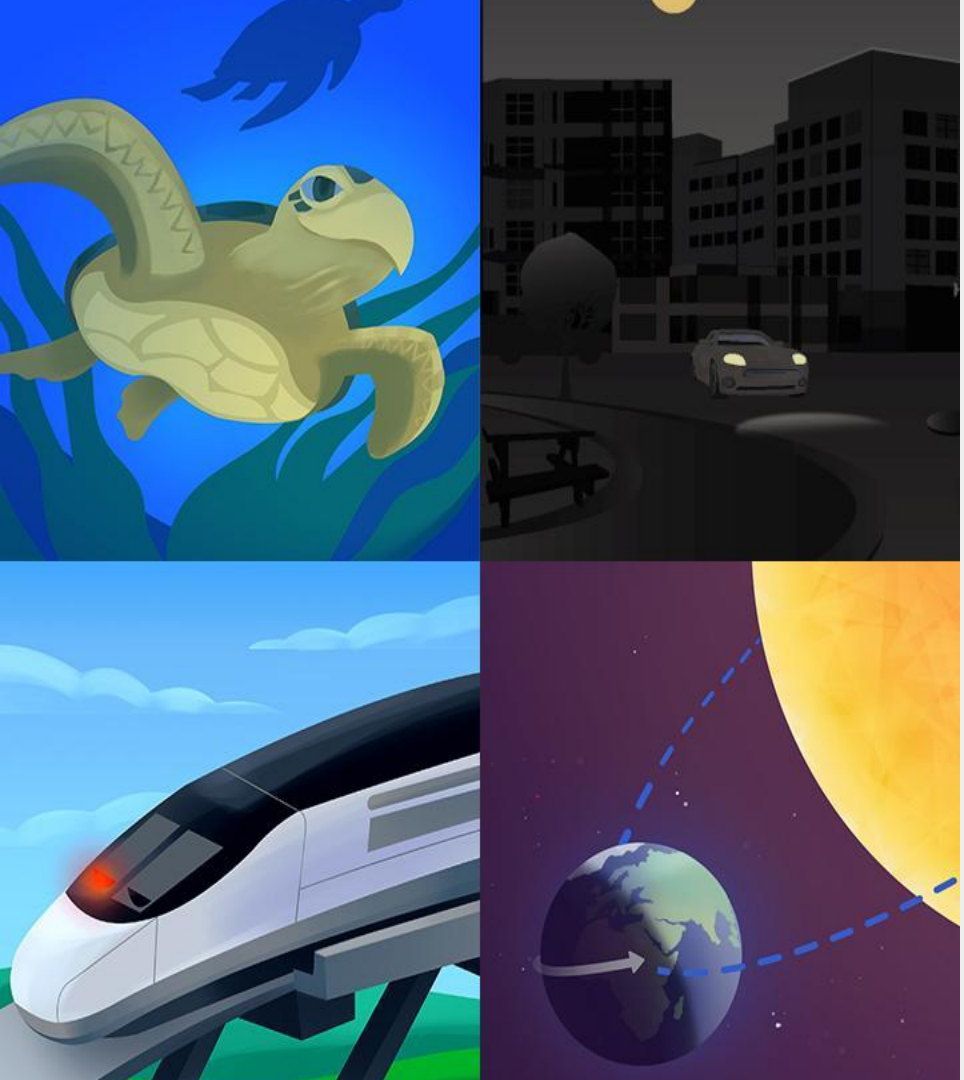
Students obtain information from text and use physical and digital models to construct understanding about how rock forms and erodes, how rock layers form, and how to use rock layers to infer the environmental changes that have happened in a place (stability and change). They apply their understanding to engage in oral and written argument about the geologic history of Desert Rocks National Park.

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

Students use physical and digital models to investigate rock samples and the changes that occur over time to form fossils and sedimentary rock (stability and change). Students obtain and combine information to describe what Desert Rocks National Park was like in the past.

Lesson 1.2: Clues from the Past

Students obtain and evaluate information from the book *Clues from the Past* to see how geologists use observations of fossils in the present, and cause-and-effect relationships, to make inferences about the past (cause and effect).



Plan for the day: Part 1

- Introduction and Framing
- NGSS & 3D Learning
- Phenomenon-based Instruction
- Unit Internalization
- Additional Resources
- Closing

Next Generation Science Standards

Phenomenon-based learning and teaching

A scientific phenomenon is an **observable event** that occurs in the universe that we can use science ideas to explain or predict.

Comparing topics and phenomena

Topic-based	Phenomenon-based
Chemical reactions	There's a reddish-brown substance in a town's tap water.

Next Generation Science Standards

How might learning be different?

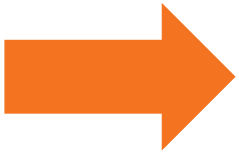
Topic-based	Phenomenon-based
Chemical reactions	There's a reddish-brown substance in a town's tap water.
Electric circuits	A flashlight won't turn on, even though it used to work.
Natural selection	A population of newts has become more poisonous over time.

Comparing topics and phenomena

A shift in science instruction

from learning about

(like a student)



to figuring out

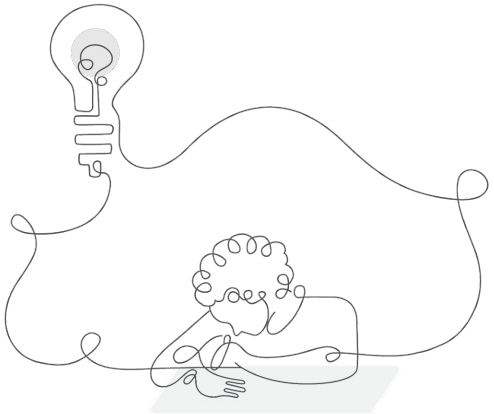
(like a scientist)

Previewing the unit

Introducing the 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.



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.

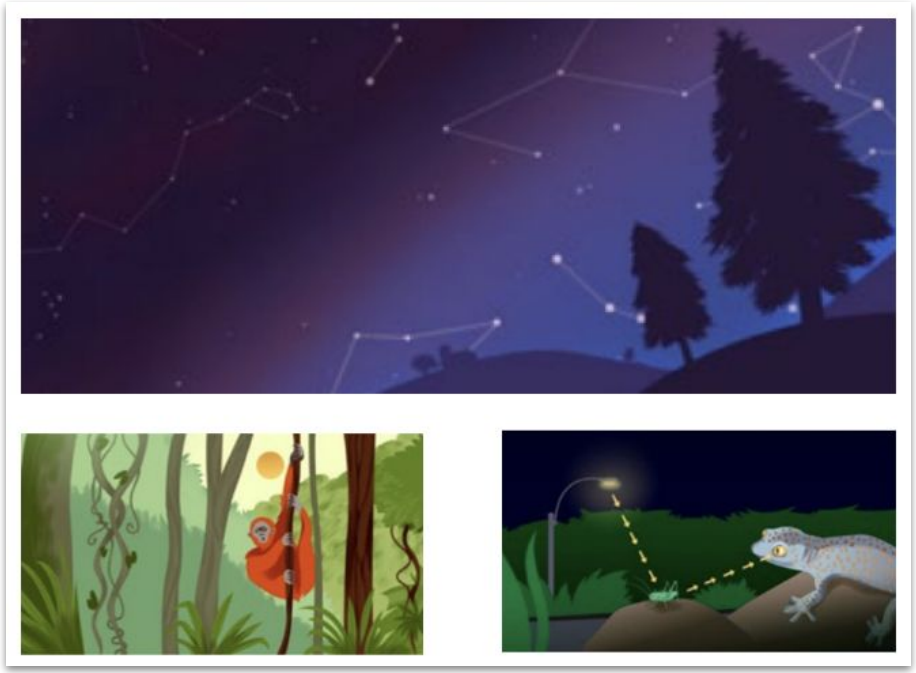
This unit will focus on **fossils** and the **rock** in which they form.

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

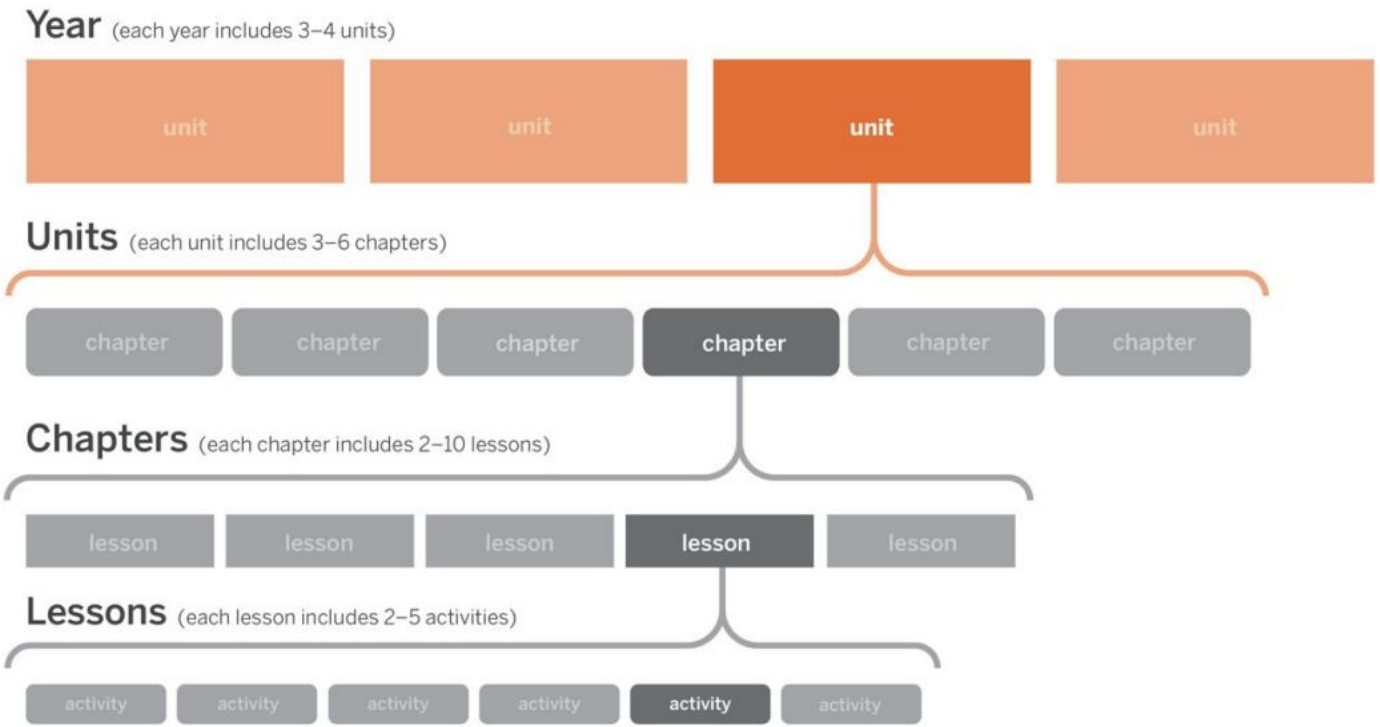
Amplify Science

Anchoring phenomenon

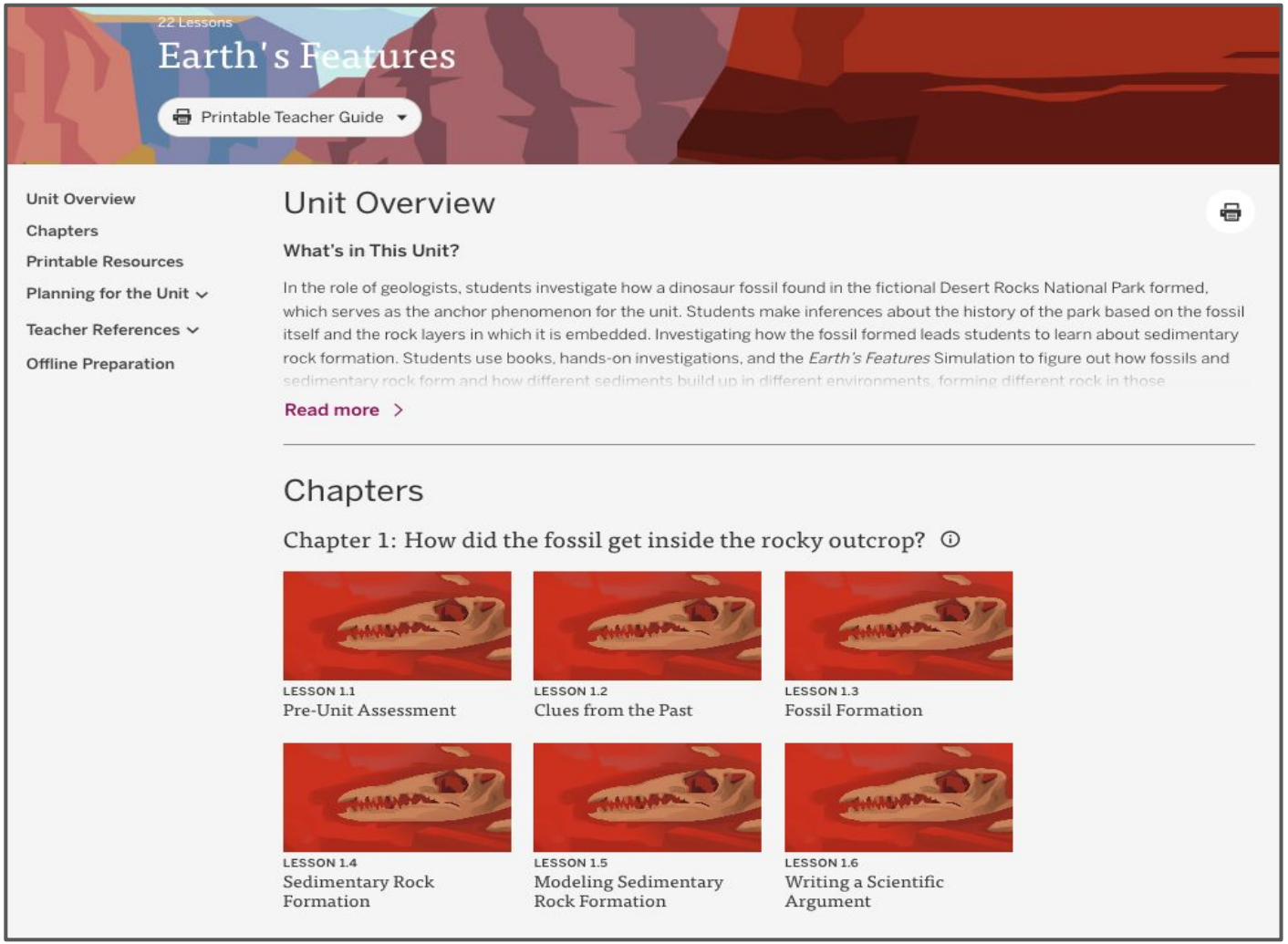
- Complex and rich
- Drives learning through a whole unit
- Specific and observable
- Relatable at students' developmental level



K-5 Navigation structure



Let's Go Live!

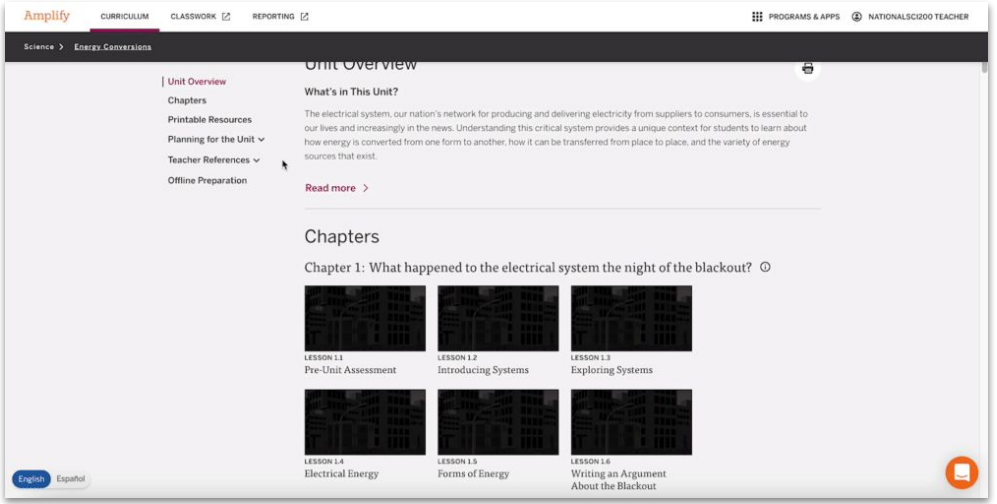

22 Lessons
Earth's Features
Printable Teacher Guide
Unit Overview
Chapters
Printable Resources
Planning for the Unit
Teacher References
Offline Preparation
Unit Overview
What's in This Unit?
In the role of geologists, students investigate how a dinosaur fossil found in the fictional Desert Rocks National Park formed, which serves as the anchor phenomenon for the unit. Students make inferences about the history of the park based on the fossil itself and the rock layers in which it is embedded. Investigating how the fossil formed leads students to learn about sedimentary rock formation. Students use books, hands-on investigations, and the Earth's Features Simulation to figure out how fossils and
Read more
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

Unit Level resources

Pg. 11-13

Collection of resources to support planning and day-to-day instruction in the unit:

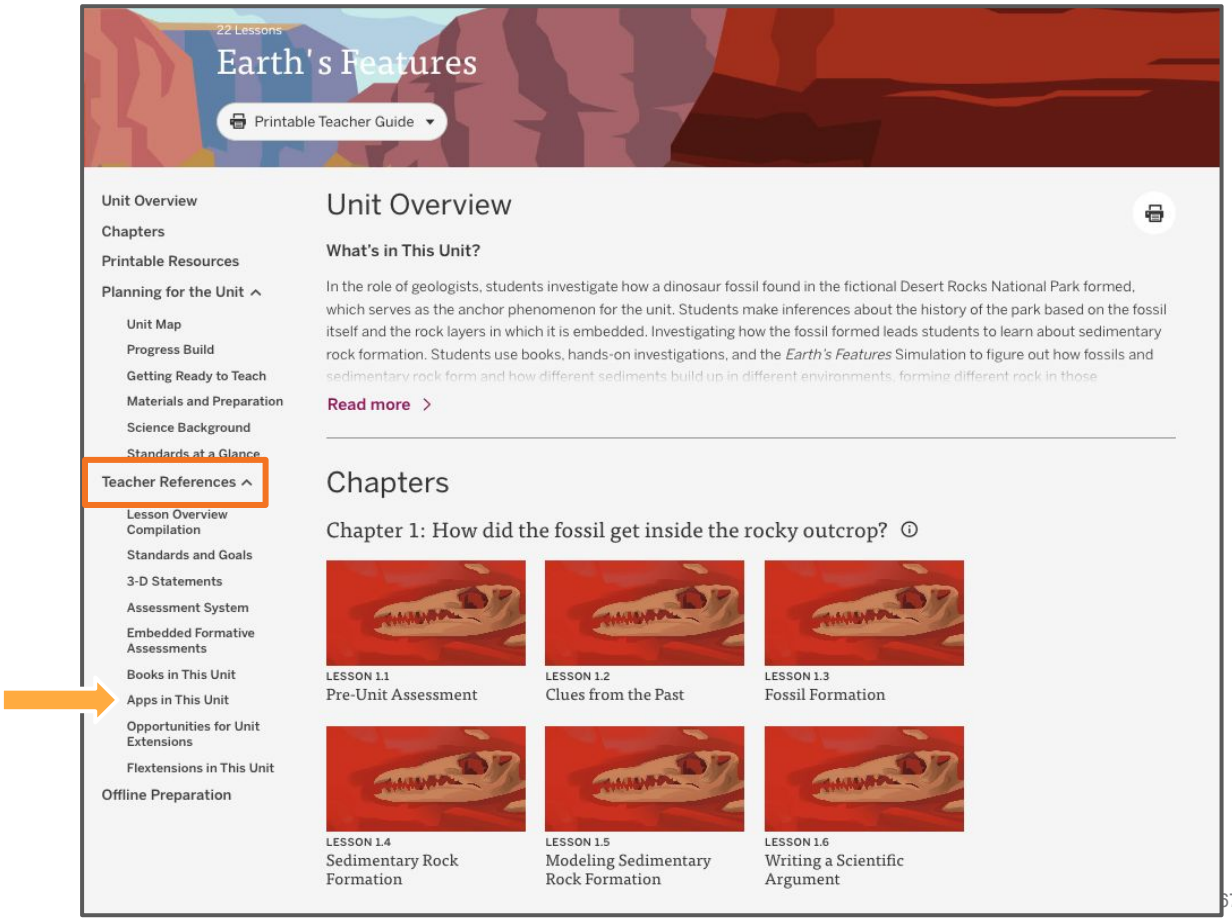
- Printable Resources
- “Planning for the Unit” documents
- Teacher References



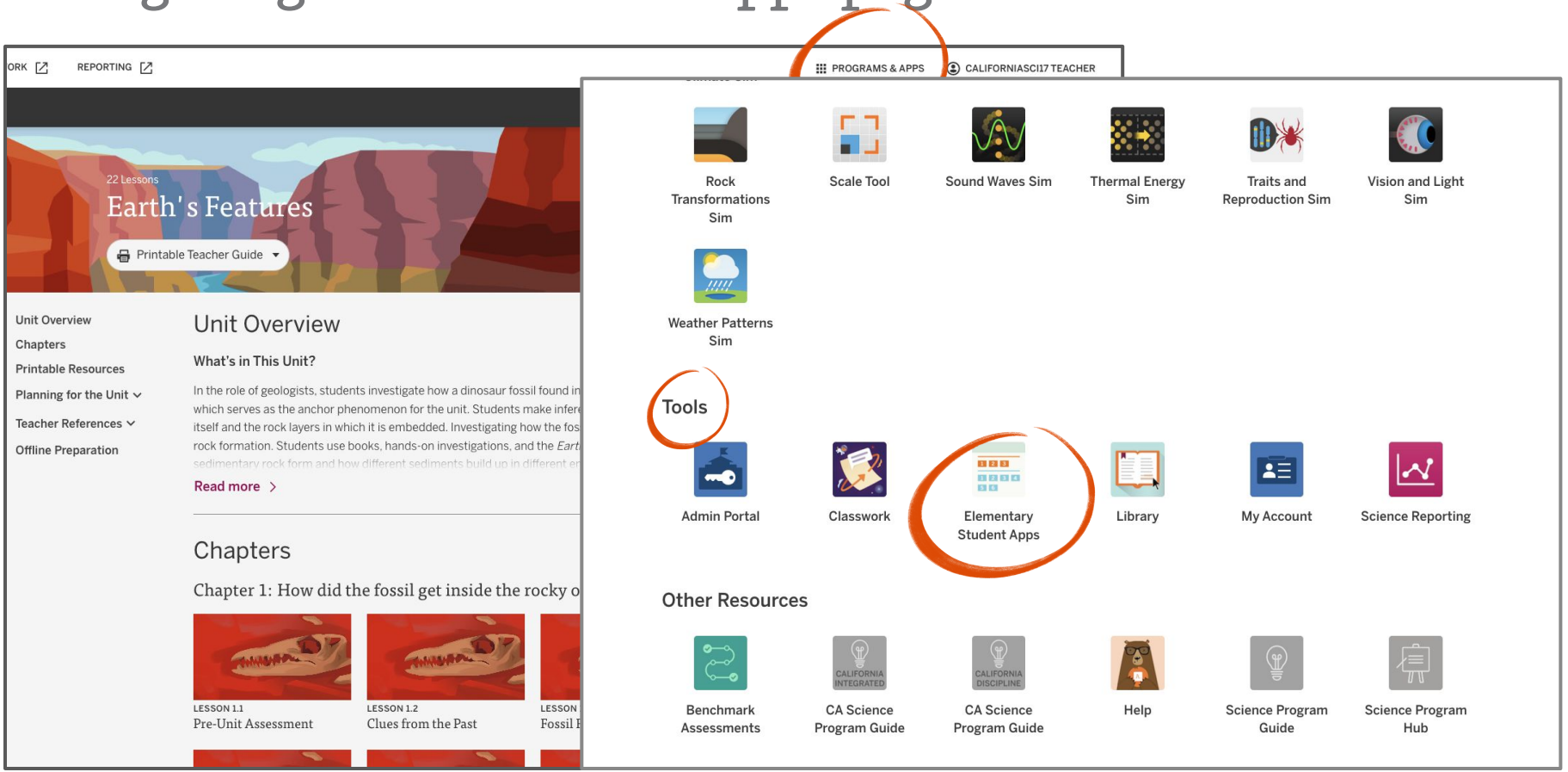
Key Unit Documents for Unit Planning

Apps in this Unit

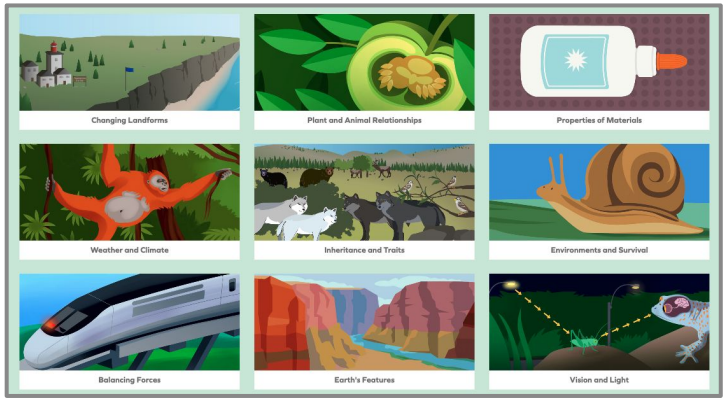
Let's take a few minutes to review the **Practice Tools and Simulations** in this unit document and explore the digital tools

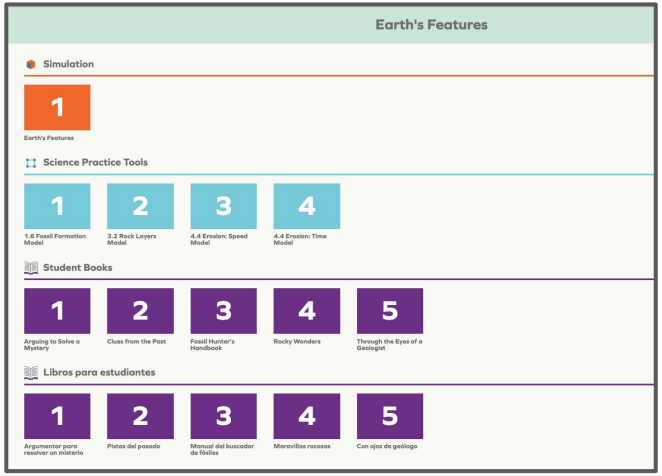


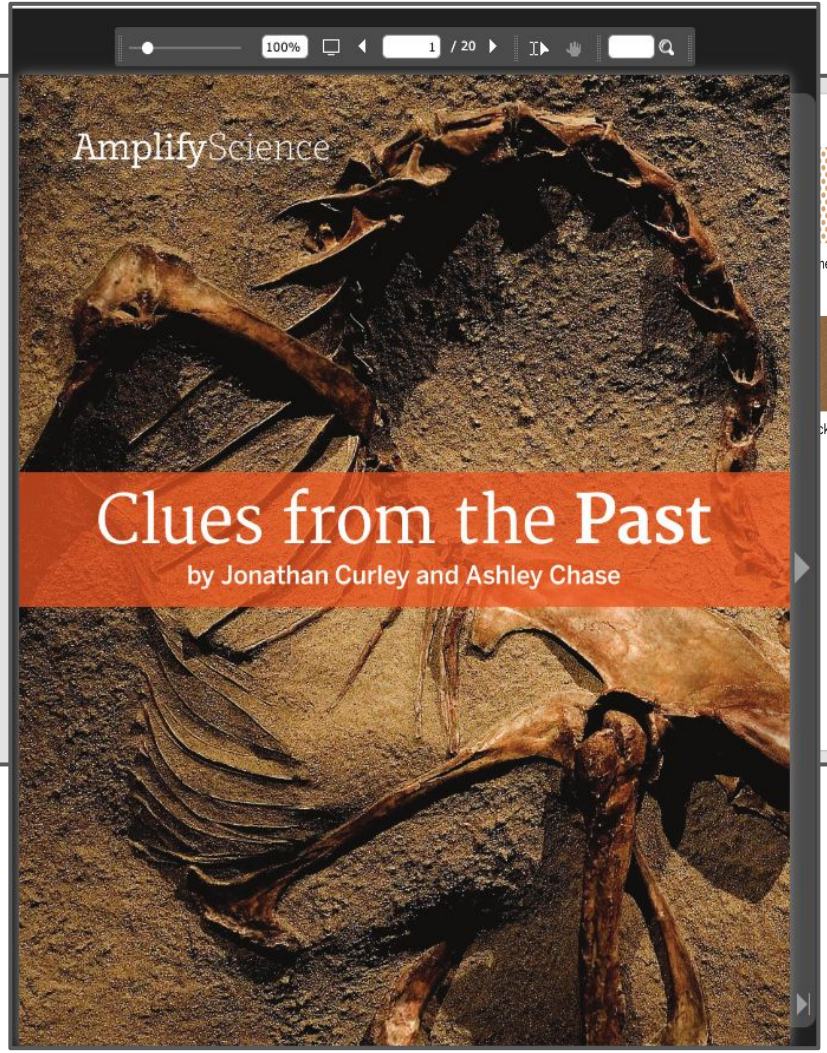
Navigating to the Student Apps page



Student Apps page



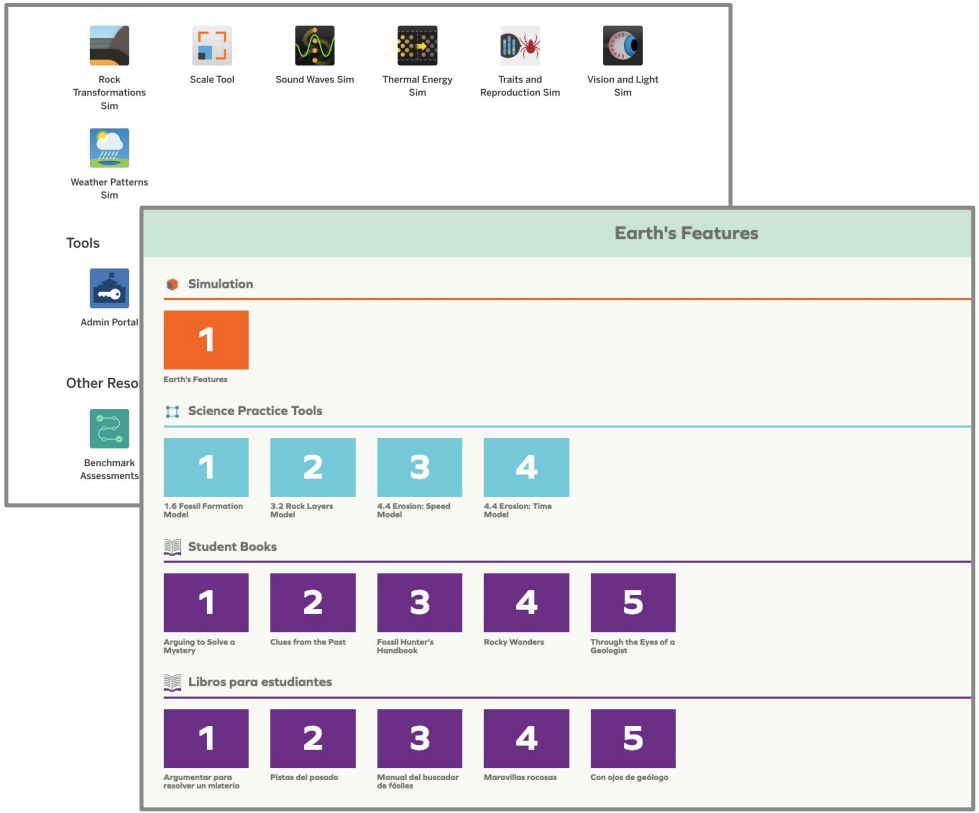




Explore the Student Apps Page

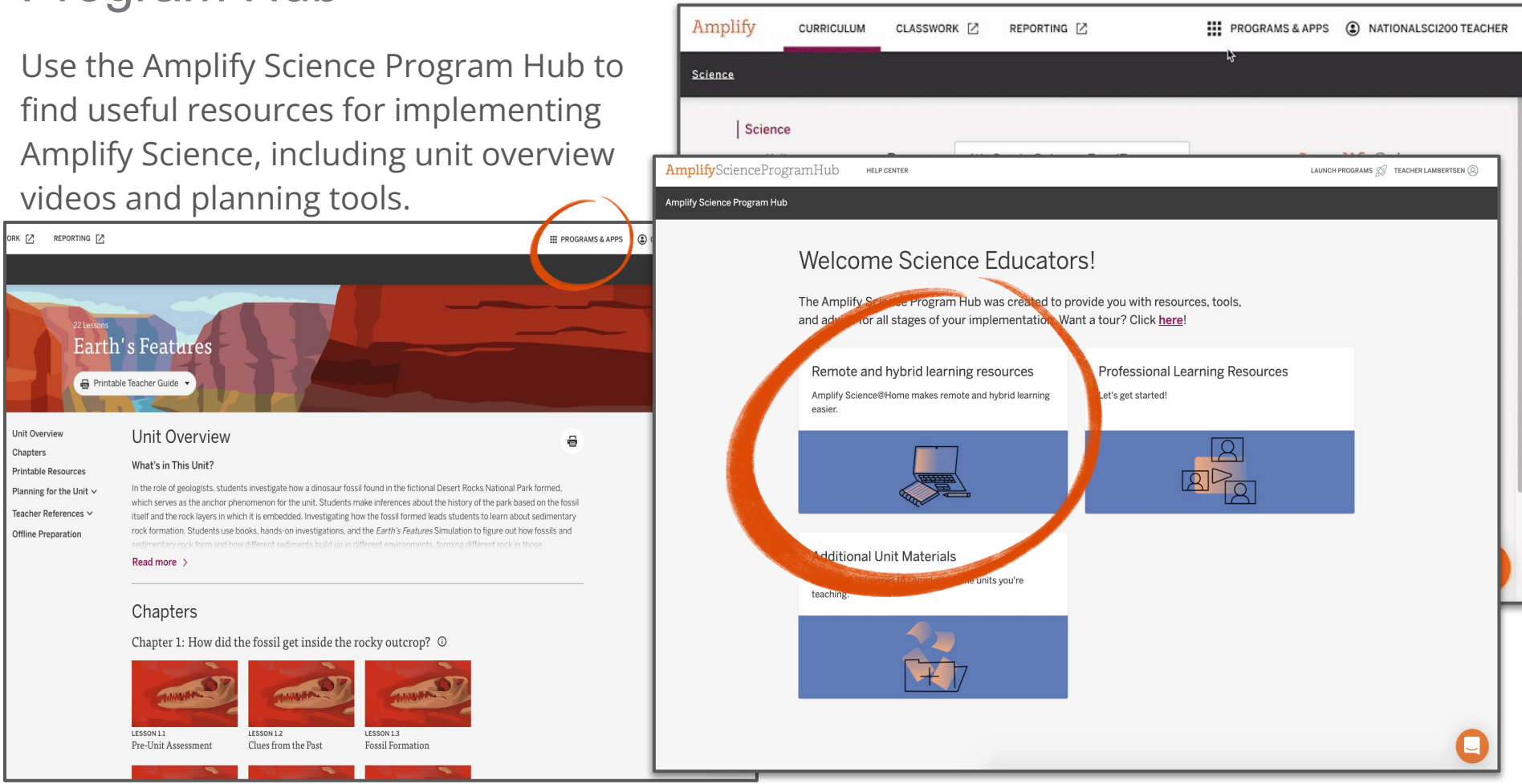
Familiarize yourself with the Program Hub.

Be ready to share one resource you've found that you'll use while planning and teaching.



Program Hub

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



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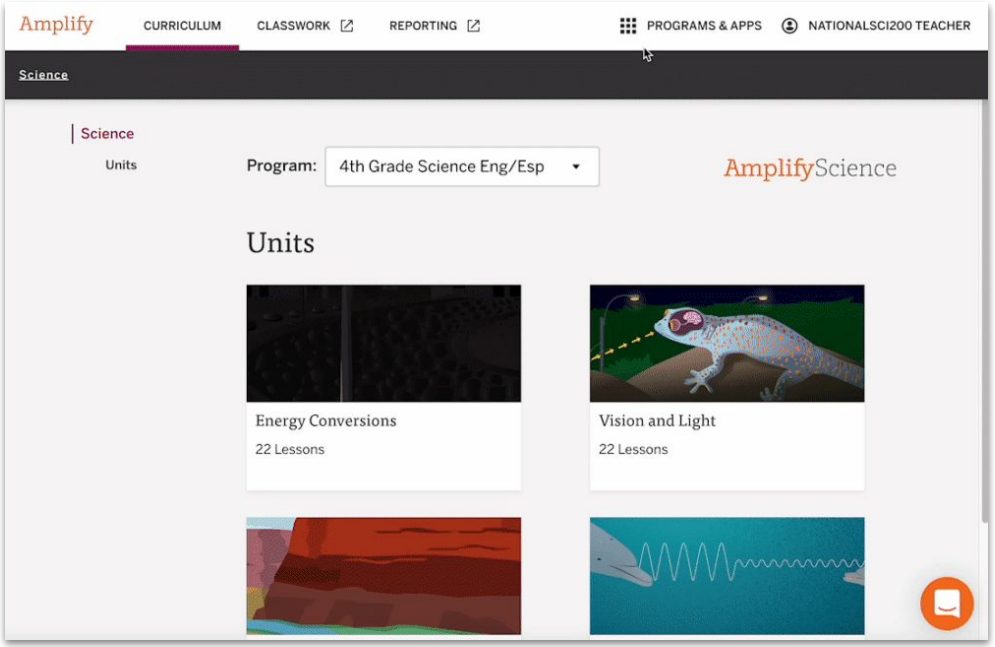
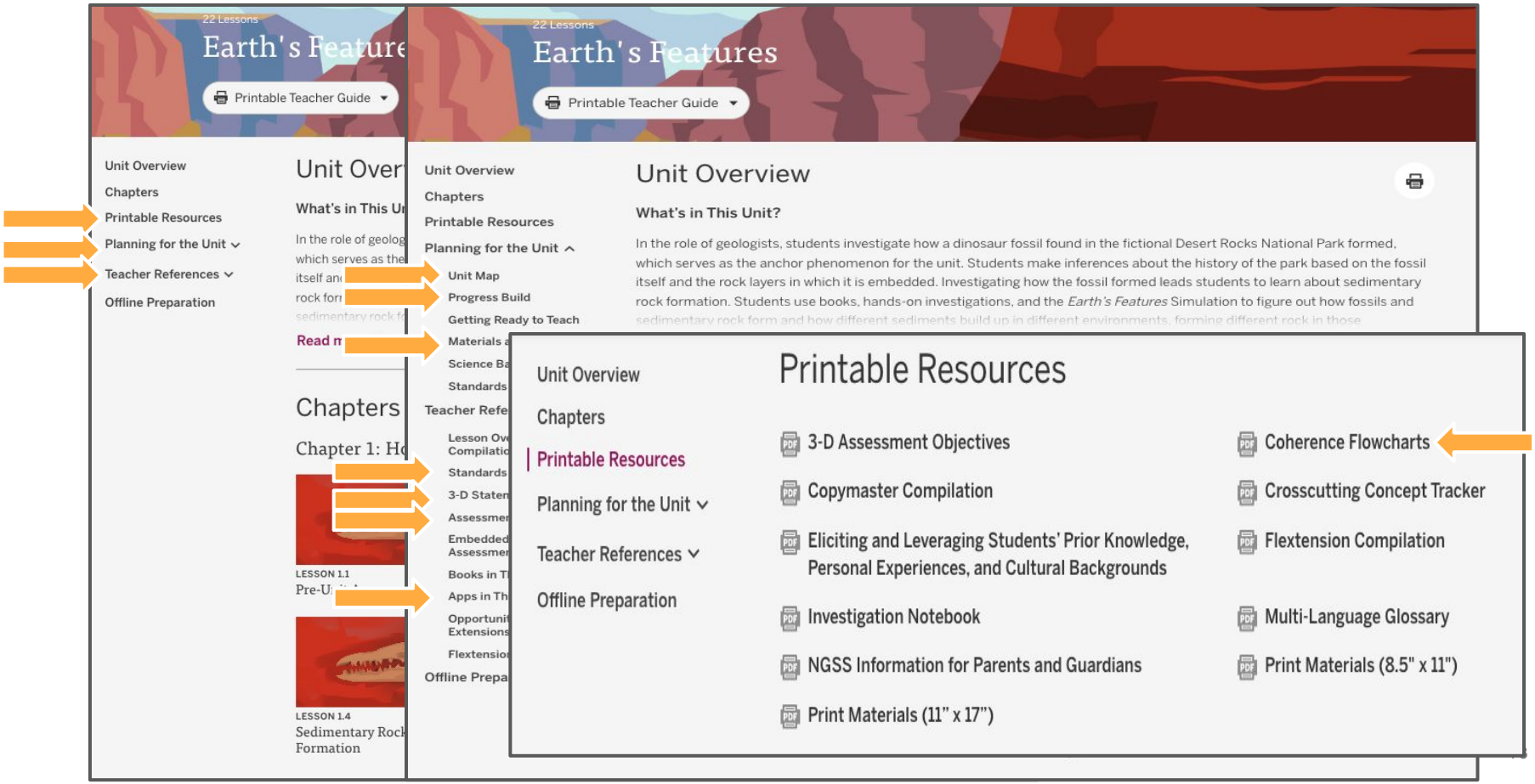


Key Unit Documents for Unit Planning



Core Unit Planning & Internalization

Unit Title:	1

Overview

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

What is the phenomenon/real-world problem students are investigating in your unit? 2	Student Role: 3
Unit Question: 4	Relationship between the Unit Phenomenon and Unit Question: 5
By the end of the unit, students figure out... 6	
How do students engage with three-dimensional learning to figure out the phenomenon/real-world problem in your unit? 7	

1

Unit Guide resources:
- **Unit Overview**
- **Unit Map**
- ***Coherence Flowchart***

Unit Guide resources:
- **Lesson Overview Compilation**
- **Unit Overview**

Unit Guide resources:
- **Unit Map**

Unit Guide resources:
- **3D Statements at the Unit Level**

Core Unit Planning & Internalization

Unit Title:	Earth's Features

Overview

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

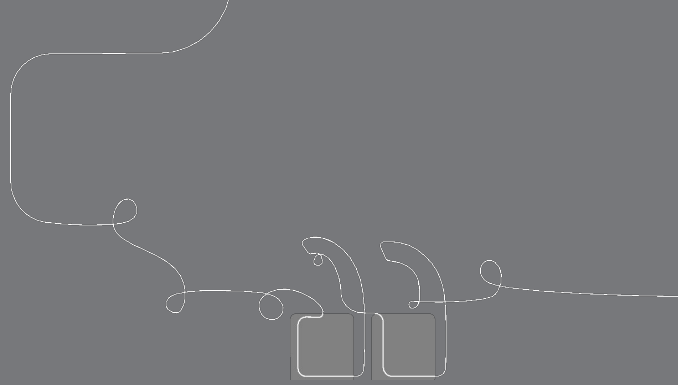
What is the phenomenon/real-world problem students are investigating in your unit?	Student Role:
Students explain how and when a particular fossil formed and how it came to be in its current location.	Geologists
Unit Question:	**Relationship between the Unit Phenomenon and Unit Question:**
How do rocks and fossils tell us about the way Earth changes over time?	Students figure out how a dinosaur fossil was formed by investigating how fossils and rocks form as the Earth changes over time.

By the end of the unit, students figure out...

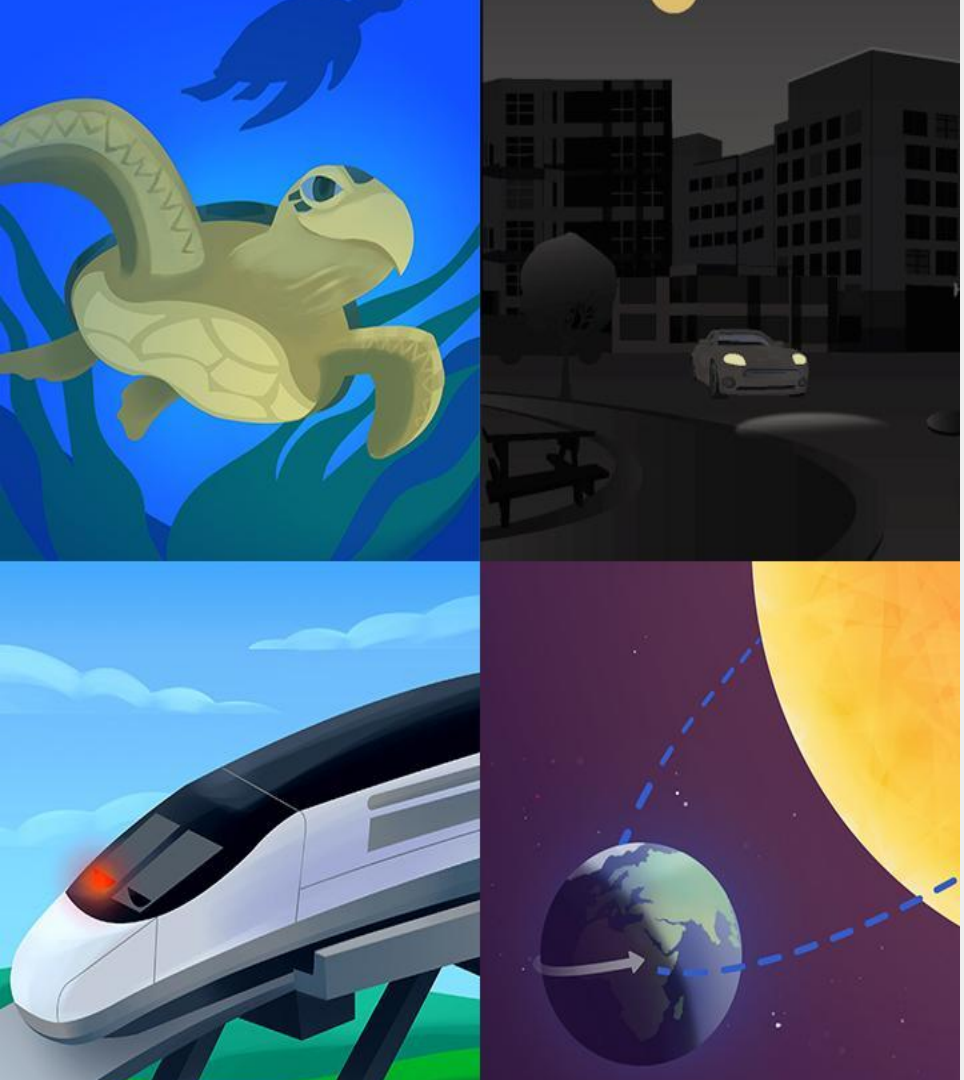
Students figure out what the environment of the park was like in the past and why it has so many visible rock layers.

How do students engage with three-dimensional learning to figure out the phenomenon/real-world problem in your unit?

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 the Park.

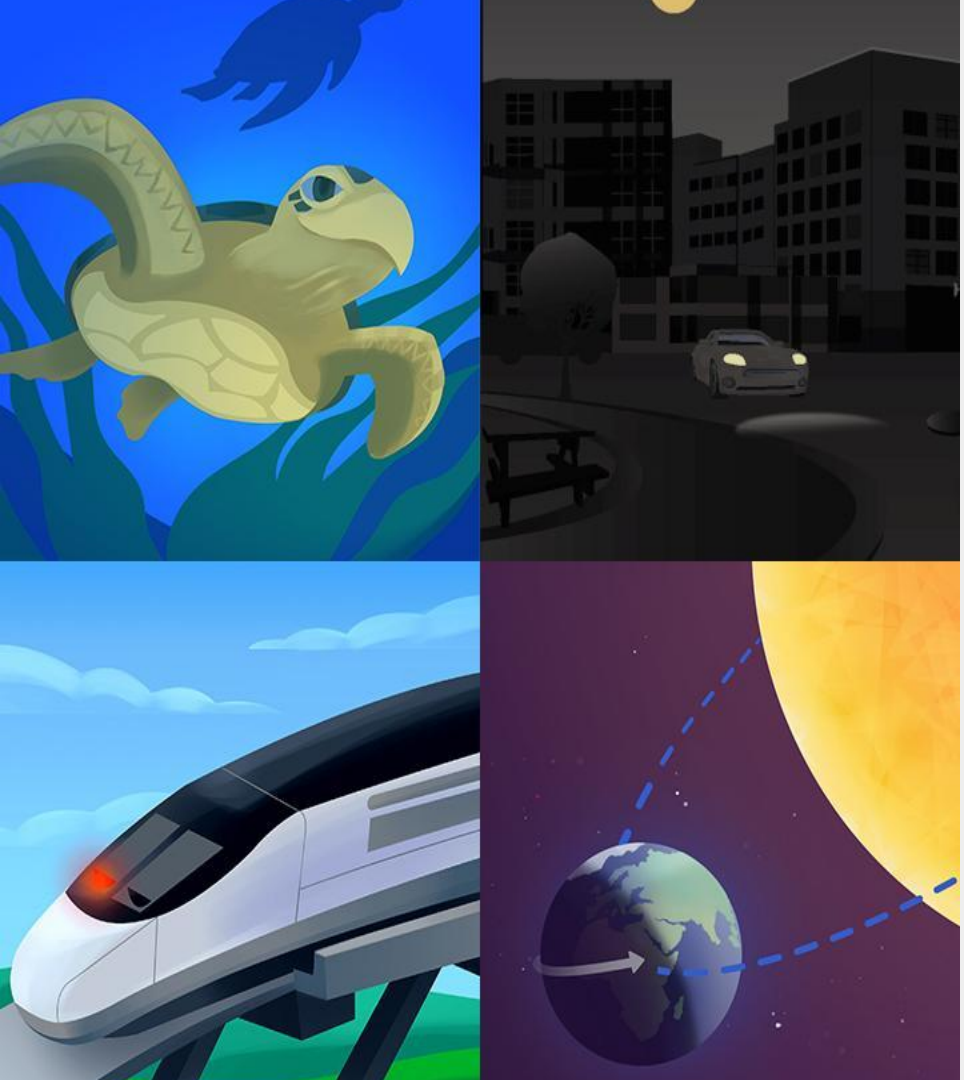


Questions?



Plan for the day: Part 1

- Introduction and Framing
- NGSS & 3D Learning
- Phenomenon-based Instruction
- Unit Internalization
- Additional Resources
- Closing



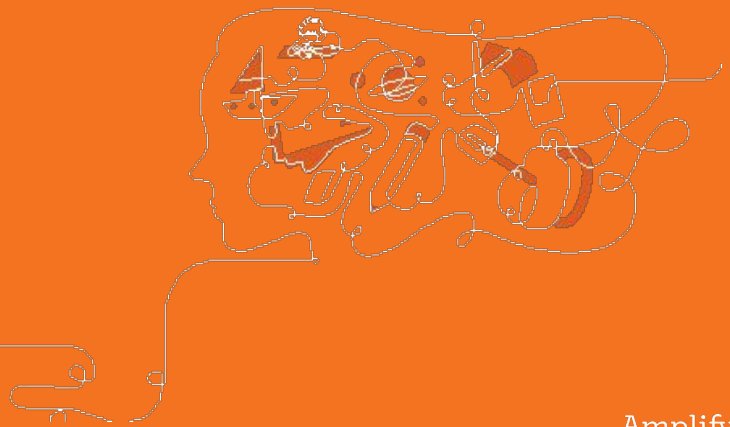
Plan for the day: Part 1

- Introduction and Framing
- NGSS & 3D Learning
- Phenomenon-based Instruction
- Unit Internalization
- Additional Resources
- Closing

Overarching goals

- ✓ Explain how students engage in phenomenon based and 3D learning to construct an understanding of the science concepts introduced in the unit *Earth's Features.*
- ✓ Internalize the unit and apply your new understanding to plan for the diverse needs of your classroom and students

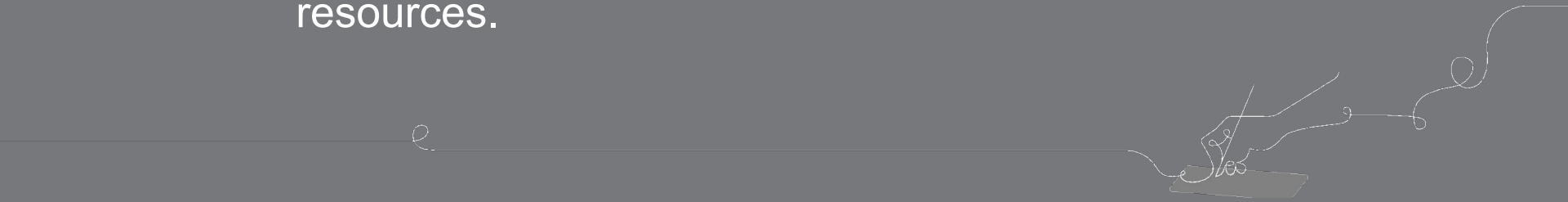
Part 2:
Guided Planning

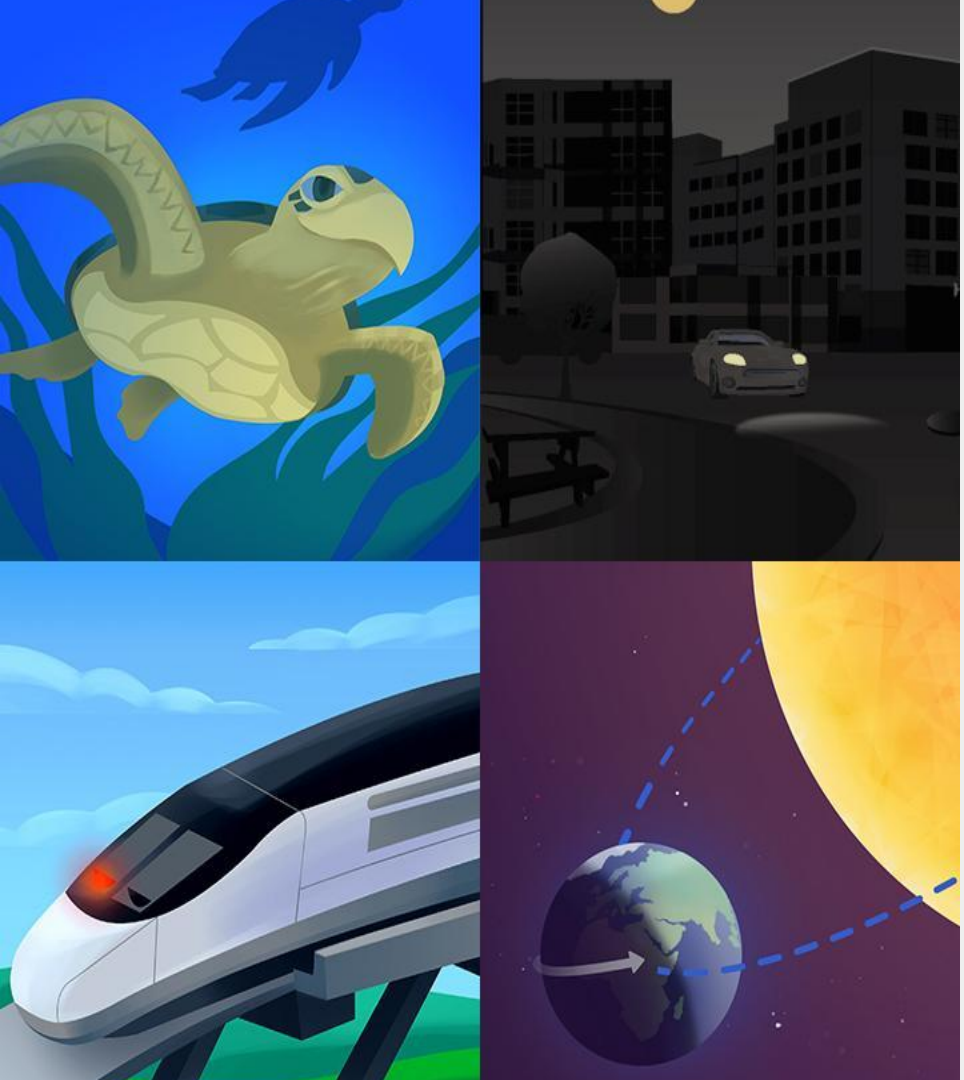


Overarching goals

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

- ❑ Describe what teaching and learning look like in Amplify Science.
- ❑ Prepare to teach using Amplify Science resources.

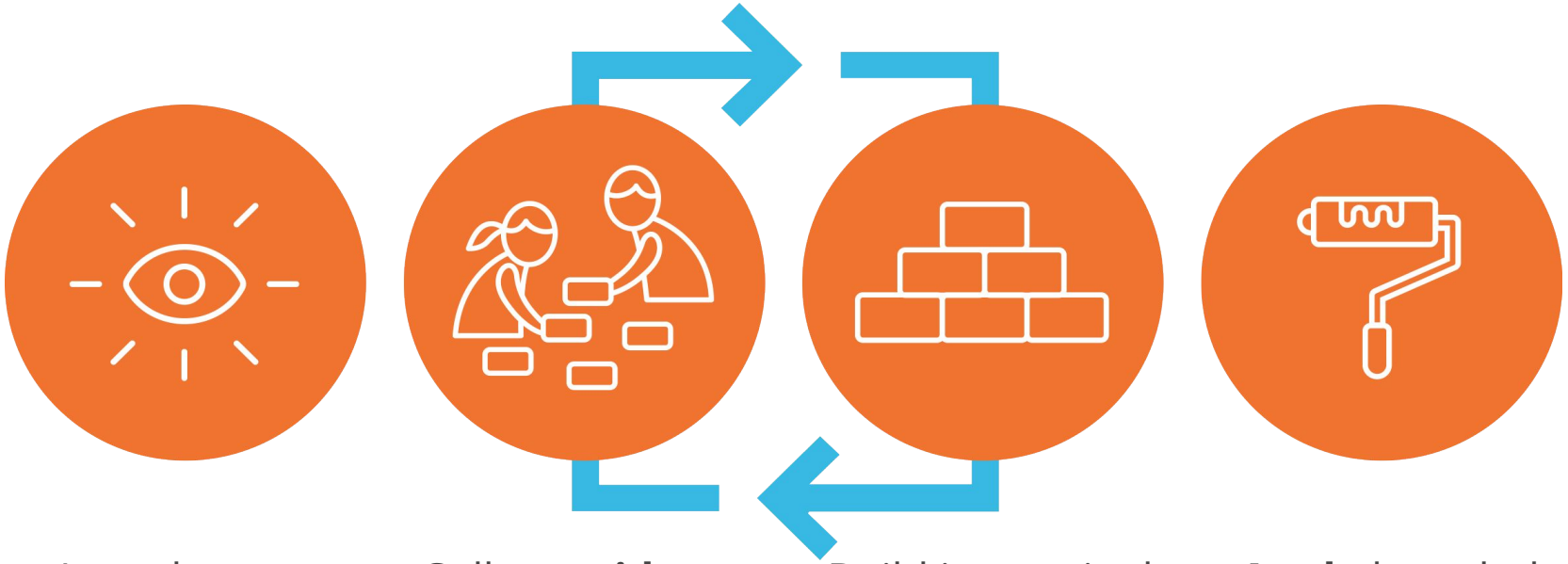




Plan for the day: Part 2

- Teaching and Learning in an Amplify Science Lesson
- Instructional Approach Reflection
- Planning a Lesson
- Closing

Amplify Science Approach



Introduce a **phenomenon** and a related problem

Collect **evidence** from multiple sources

Build increasingly complex **explanations**

Apply knowledge to solve a different problem

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.

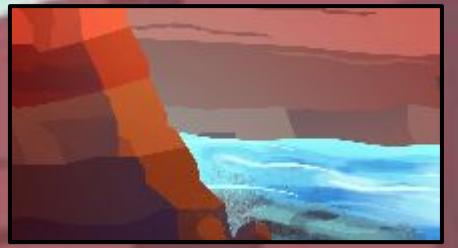
Earth's Features

Coherent Storylines

A fossil is the preserved remains of an organism that lived a long time ago. Fter to completely cover its body.

The environment was a floodplain when the lower rock layer formed and a deep ocean whe 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 Conyon.

Earth's Features

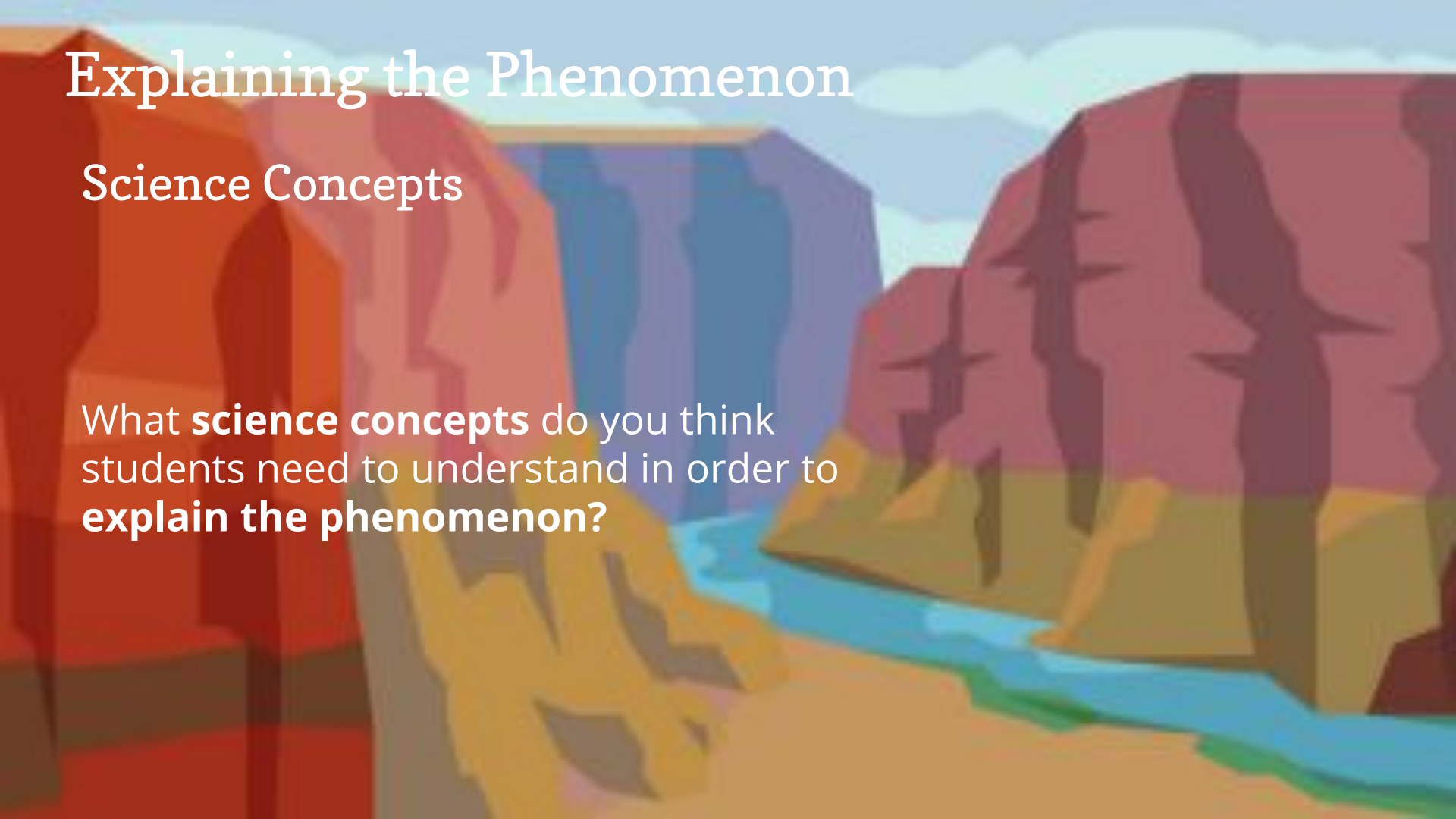
Unit Question

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

Explaining the Phenomenon

Science Concepts

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



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.

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.

Level 2

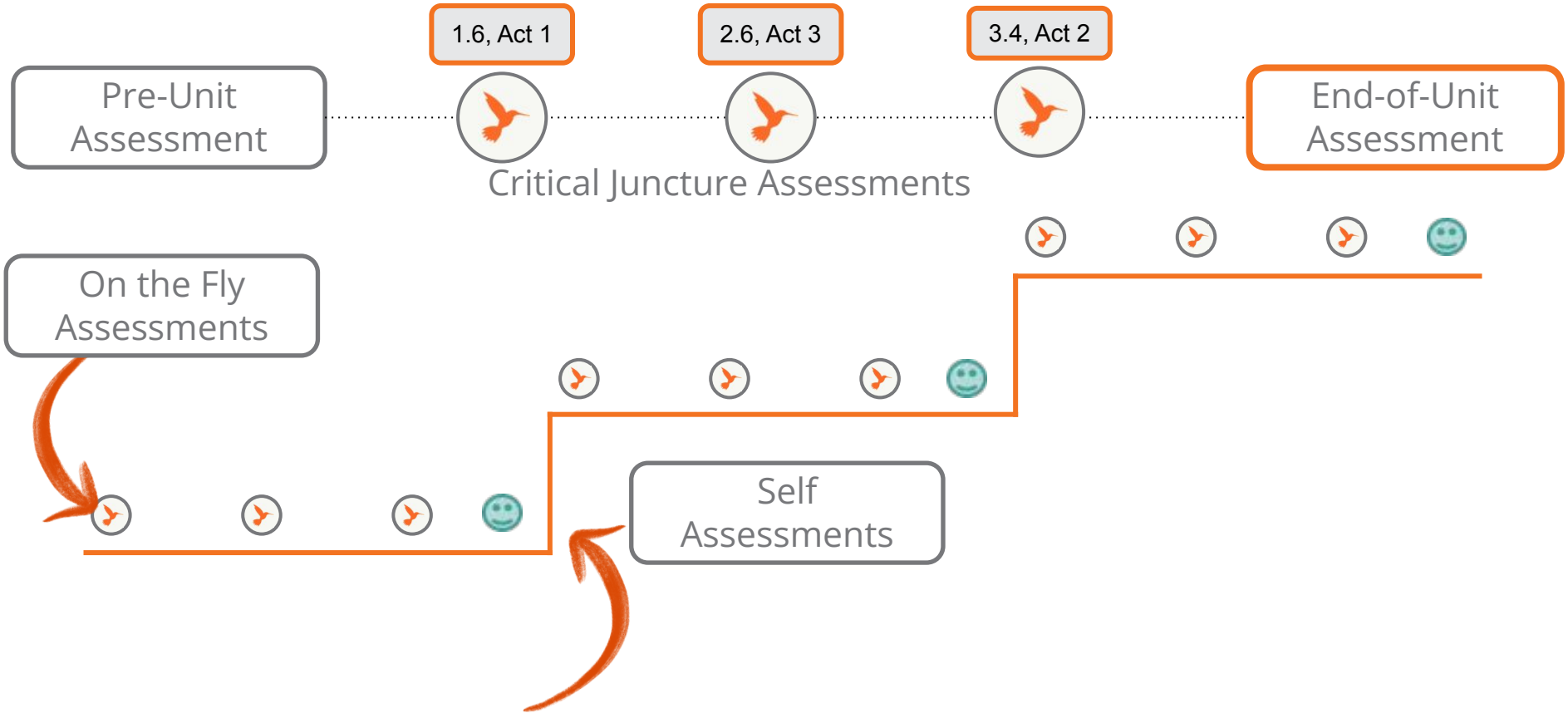
Different sedimentary rock forms in different environments.

Level 3

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

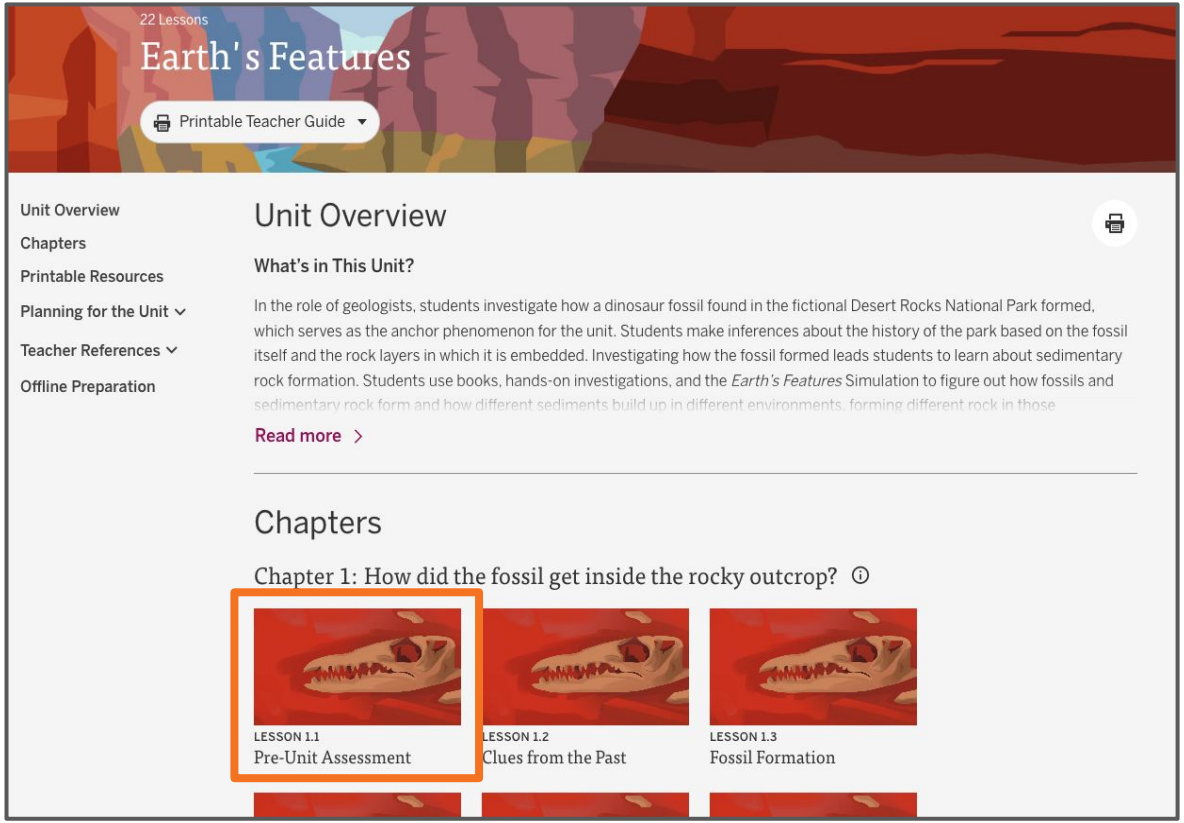
Prior knowledge → Deep, causal understanding

Earth's Features: K-5 Assessment System

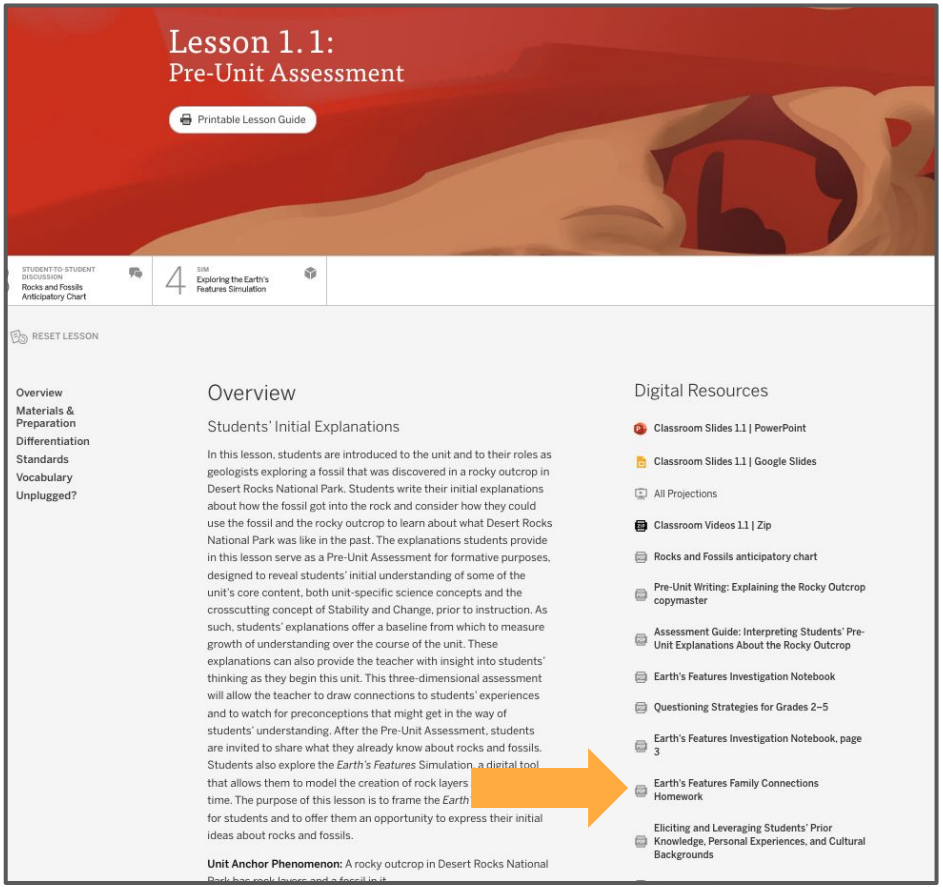


Beginning the Unit

The first lesson of every Unit is a pre-unit assessment.



Earth's Features Family Connection



Lesson 1.1:
Pre-Unit Assessment

Printable Lesson Guide

STUDENT-TO-STUDENT DISCUSSION
Rocks and Fossils Anticipatory Chart

4

SIM
Exploring the Earth's Features Simulation

RESET LESSON

Overview
Materials & Preparation
Differentiation
Standards
Vocabulary
Unplugged?

Overview

Students' Initial Explanations

In this lesson, students are introduced to the unit and to their roles as geologists exploring a fossil that was discovered in a rocky outcrop in Desert Rocks National Park. Students write their initial explanations about how the fossil got into the rock and consider how they could use the fossil and the rocky outcrop to learn about what Desert Rocks National Park was like in the past. The explanations students provide in this lesson serve as a Pre-Unit Assessment for formative purposes, designed to reveal students' initial understanding of some of the unit's core content, both unit-specific science concepts and the crosscutting concept of Stability and Change, prior to instruction. As such, students' explanations offer a baseline from which to measure growth of understanding over the course of the unit. These explanations can also provide the teacher with insight into students' thinking as they begin this unit. This three-dimensional assessment will allow the teacher to draw connections to students' experiences and to watch for preconceptions that might get in the way of students' understanding. After the Pre-Unit Assessment, students are invited to share what they already know about rocks and fossils. Students also explore the *Earth's Features* Simulation, a digital tool that allows them to model the creation of rock layers
time. The purpose of this lesson is to frame the *Earth*
for students and to offer them an opportunity to express their initial ideas about rocks and fossils.

Unit Anchor Phenomenon: A rocky outcrop in Desert Rocks National

Digital Resources

- Classroom Slides 1.1 | PowerPoint
- Classroom Slides 1.1 | Google Slides
- All Projections
- Classroom Videos 1.1 | Zip
- Rocks and Fossils anticipatory chart
- Pre-Unit Writing: Explaining the Rocky Outcrop copymaster
- Assessment Guide: Interpreting Students' Pre-Unit Explanations About the Rocky Outcrop
- Earth's Features Investigation Notebook
- Questioning Strategies for Grades 2–5
- Earth's Features Investigation Notebook, page 3
- Earth's Features Family Connections Homework
- Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds

Name: _____ Date: _____

Earth's Features Family Connections Homework

1. Choose a member of your household and tell them about what we are investigating in science class.
2. Ask them about their experiences, ideas, and questions related to our investigations.
3. Write notes about what you learn.

Summary of our investigation you can share:
In science class, we are working as geologists to figure out how and when a particular fossil formed and how it came to be in its current location. We will be answering the question, *How do rocks and fossils tell us about the way Earth changes over time?*

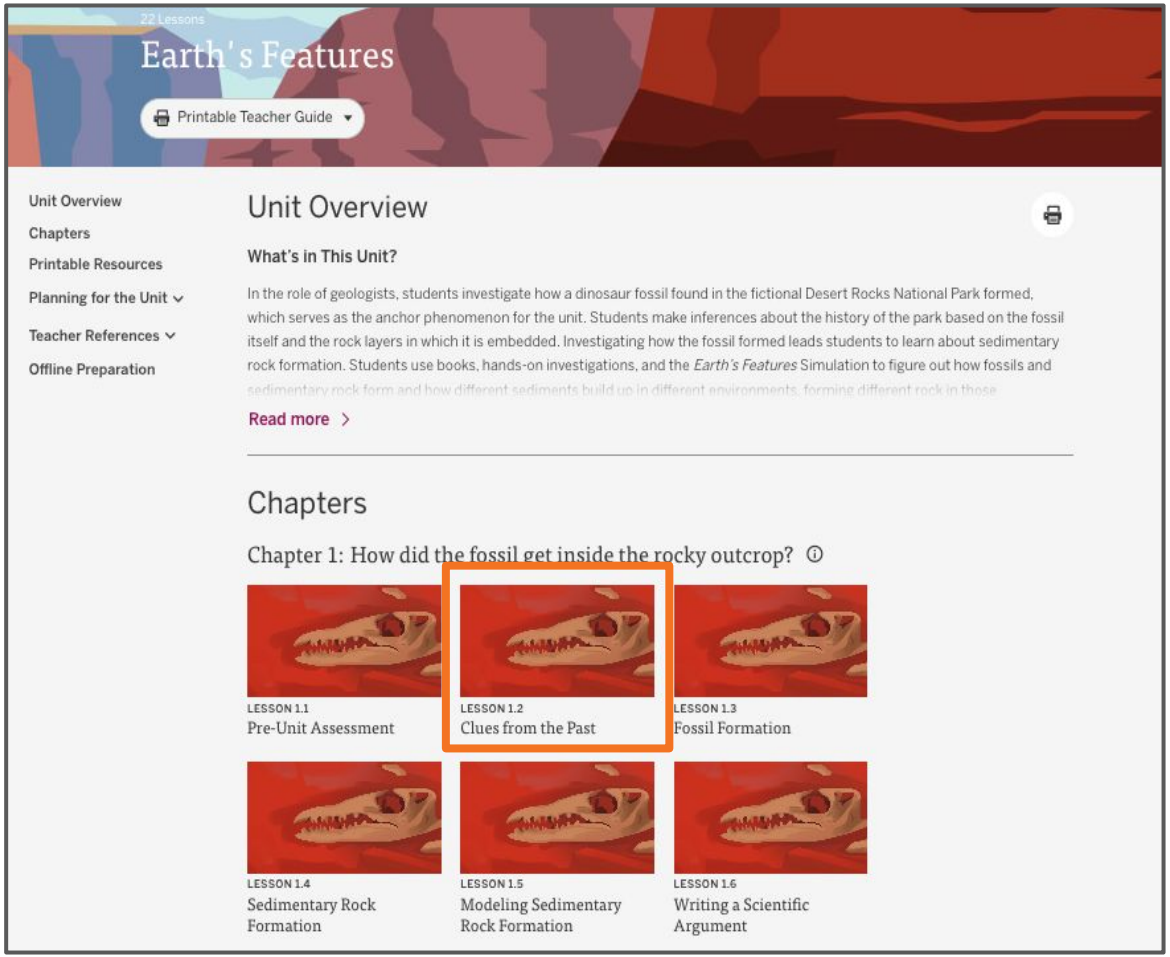
Ask questions such as:

- What does our investigation make you think of?
- Do you have any memories, stories, expertise, or experiences about something like what we're investigating?
- What have you heard or learned about these topics?
- What do you wonder about what we are investigating?

Write notes here about what you learn:

Beginning the Unit

We will be looking at Chapter 1, Lesson 2 for our model lesson.



Grade 4 | Earth's Features

Lesson 1.2: Clues from the Past

AmplifyScience

Activity 1

Introducing Observations and Inferences

Chapter 1 Question

How did the fossil get inside the rocky outcrop?

We will first need to investigate this question:

How do fossils form?

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.

What do you see in this image?

In this image I see _____.

I see _____ in this image.

What do you think happened here?

I think _____.

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.

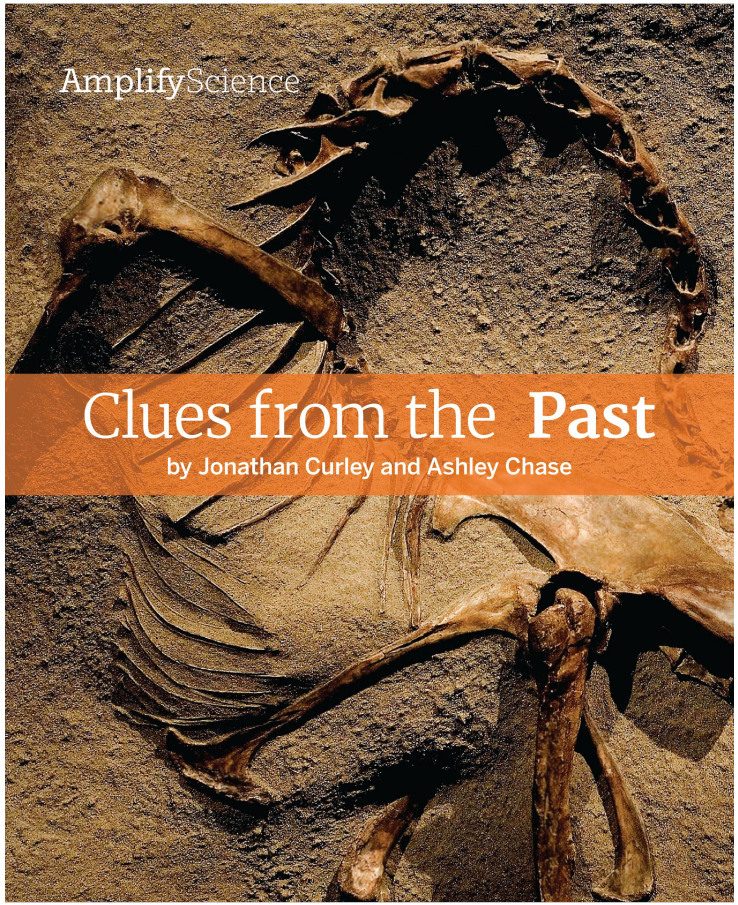
Vocabulary

fossil

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

Activity 2

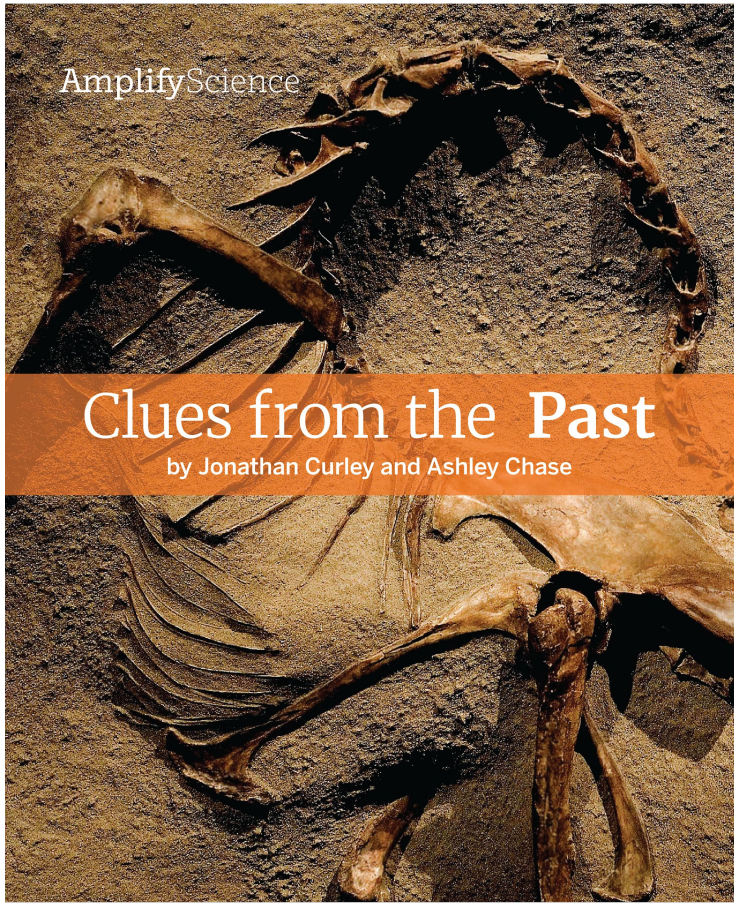
Preparing to Read Clues from the Past



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

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.



Preview the book by looking at the images and captions.

What do you think these geologists are **observing?** What kinds of **inferences** do you think they might be making?

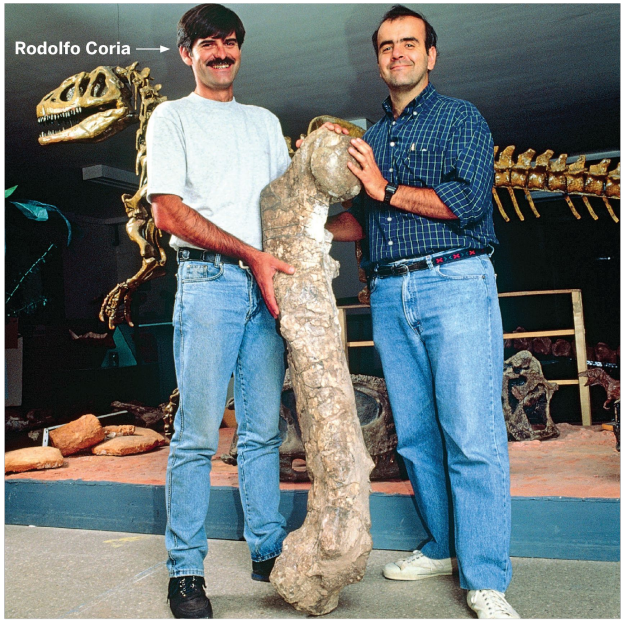
I think these geologists are observing _____.

I think an inference they are making is _____.

25 MIN

Activity 3

Partner Reading



"I felt like a mouse looking up the giant leg of an elephant." That's what Rodolfo Coria remembers about his first look at *Argentinosaurus* (ar-jen-TEEN-oh-SORE-us), a dinosaur he helped discover.

Turn to page 3.

Let's read this page together.

Rodolfo Coria is a scientist who studies dinosaurs. He lives in Argentina, a country in South America. The dinosaurs Coria studies are extinct—there are none left alive on Earth. To study dinosaurs, Coria has to make **inferences**. An inference is something he figures out by putting together what he can **observe** and what he already knows.

Turn to page 4.

Follow along as a volunteer reads out loud.

Rodolfo Coria is a scientist who studies dinosaurs. He lives in Argentina, a country in South America. The dinosaurs Coria studies are extinct—there are none left alive on Earth. To study dinosaurs, Coria has to make **inferences**. An inference is something he figures out by putting together what he can **observe** and what he already knows.

4

The last two sentences mention **inferences** and **observations**. I will reread those two sentences.

This photo shows Rodolfo Coria observing a fossil in Argentina.

Coria can't observe living dinosaurs, but he *can* observe **fossils** of dinosaurs. Fossils are imprints or parts of animals, plants, and other **organisms** that have been preserved in rock. Fossils can be found millions of years after an organism died.

Read the rest of the book.

Name: _____ Date: _____

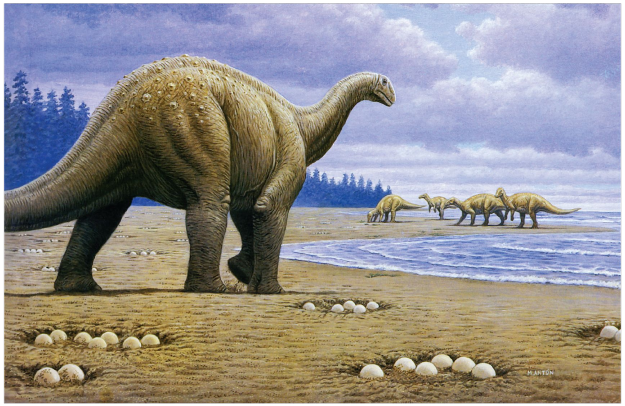
Reading About the Work of a Geologist: *Clues from the Past*

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 *Argentinosaurus*	**Inferences about *Argentinosaurus***
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.



This artwork shows what *Argentinosaurus* may have looked like. It is based on inferences.

Coria observed the shapes and sizes of the fossil bones he had found. They looked similar to fossils from large dinosaurs that had been found before. Coria could infer that the bones were from the lower leg and backbone of a dinosaur. He could also infer that the dinosaur was big and walked on four legs. Coria and the scientist he was working with named the dinosaur *Argentinosaurus* after their country. It was a type of dinosaur no one had known about before.

Let's reread page 11.

What **observation** did Coria make of the fossil bones he found?

An observation that Coria made of the fossil bones is _____.

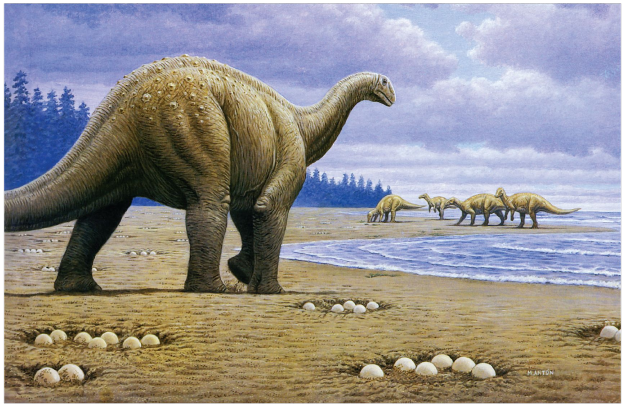
Name: _____ Date: _____

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 *Argentinosaurus*	**Inferences about *Argentinosaurus***
Page 11: He observed the sizes and shapes of fossil bones.	
Page 12:	
Page 13:	

Now we can **record** the **observation** that Dr. Coria made of the fossil bones he found.



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What **inferences** did Coria make based on his observation?

An inference that Coria made is _____.

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.
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Observations of *Argentinosaurus*	**Inferences about *Argentinosaurus***
Page 11: He observed the sizes and shapes of fossil bones.	The bones were from the lower leg and backbone of a dinosaur.
Page 12:	
Page 13:	

Next, we can record the **inference** that Dr. Coria made based on this observation.

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.
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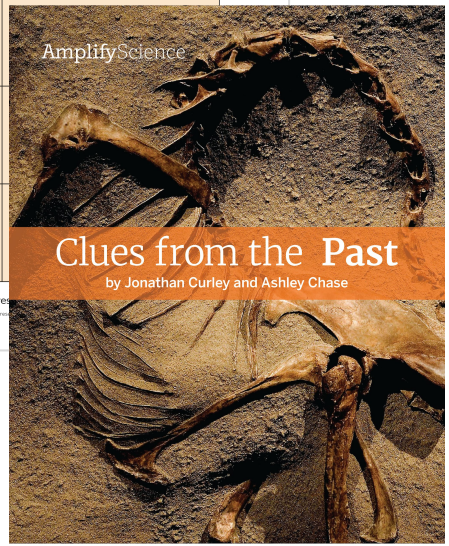
Earth's Features



Reread the book and **record** observations and inferences.

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.

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

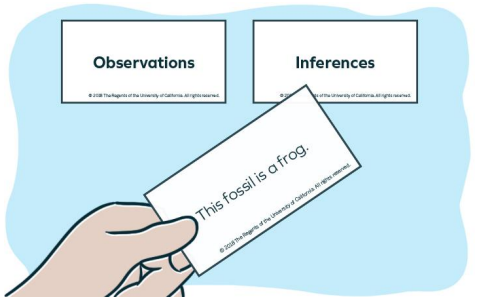
Sorting Observations and Inferences

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.

End of Lesson

THE LAWRENCE HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

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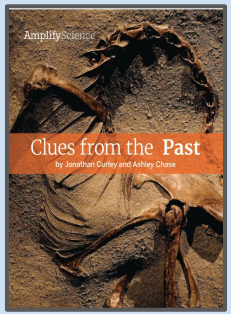
Gathering evidence

Earth's Features , 1.2

How did the fossil get inside the rocky outcrop?

How do fossils form?



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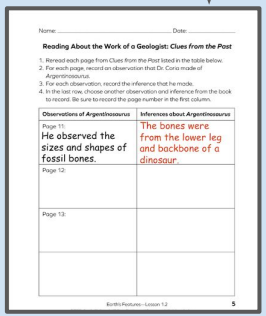

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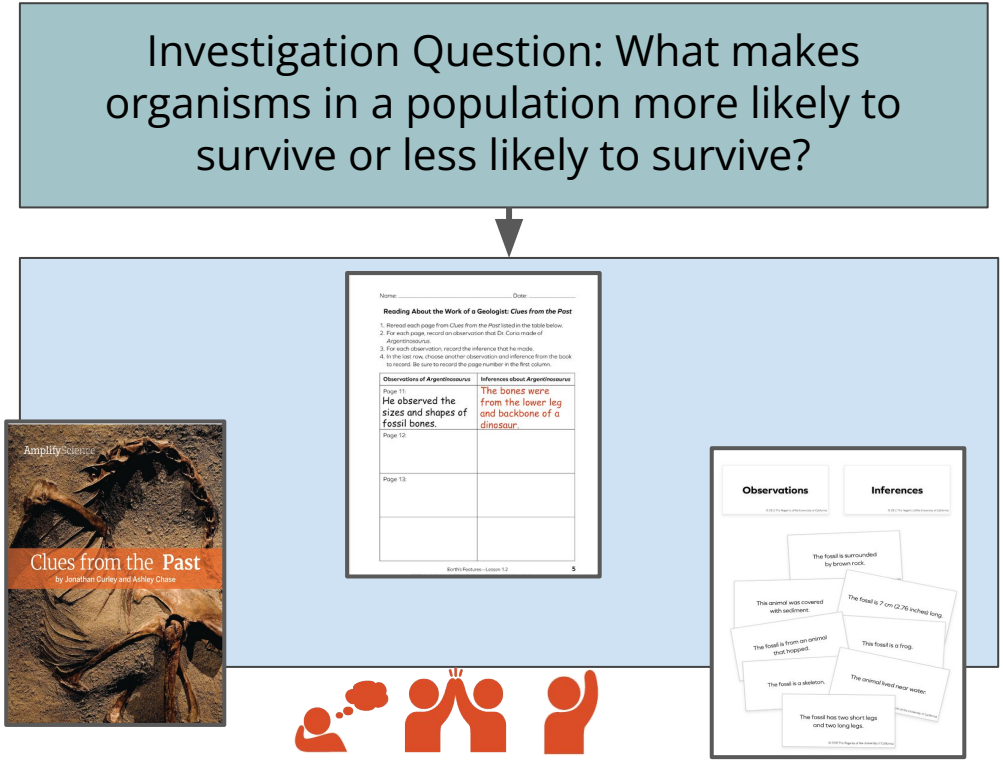
Earth's Features – Lesson 1.2 5

What have students figured out so far?

Evidence sources work together

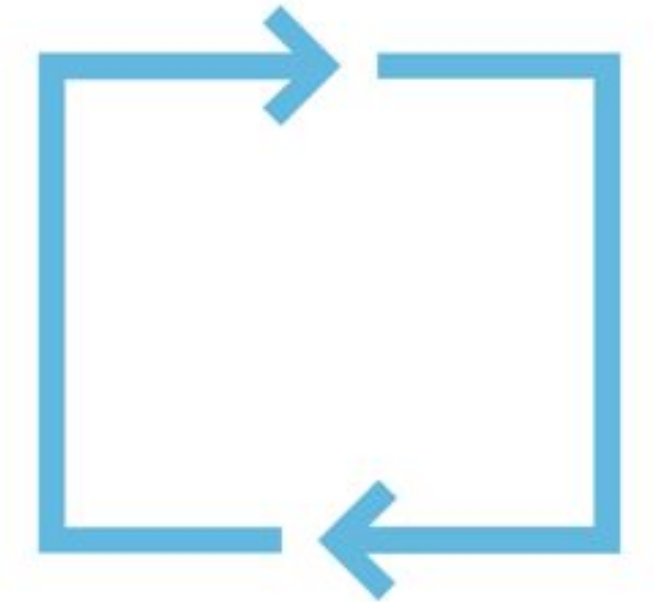
Investigating and discussing observations

How do these activities **work together** to support understanding of how different substances are different?



Multimodal learning

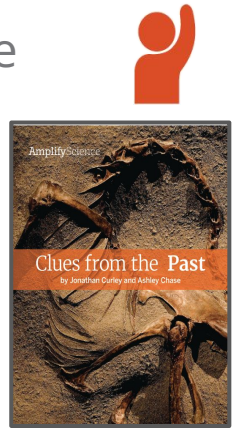
Gathering evidence over multiple lessons

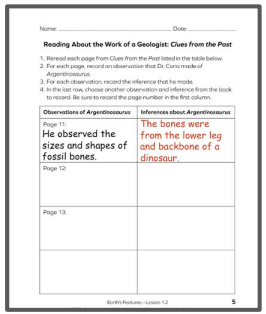


Do,
Talk,
Read,
Write,
Visualize

Evidence sources work together

Teacher tip: Every evidence source plays an important role in student learning. Be sure to teach every activity in order!

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Page 13:	

Bone's Features—Lesson 1.2 5

Coherence Flowchart

A diagram of student learning

Phenomenon
(Chapter Question)

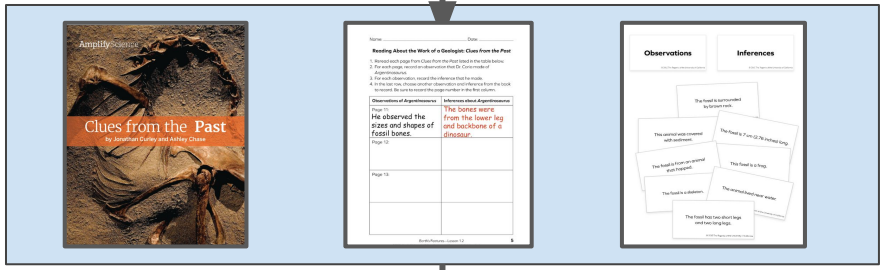
Investigation Question

Multiple sources of evidence

Key Concepts

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

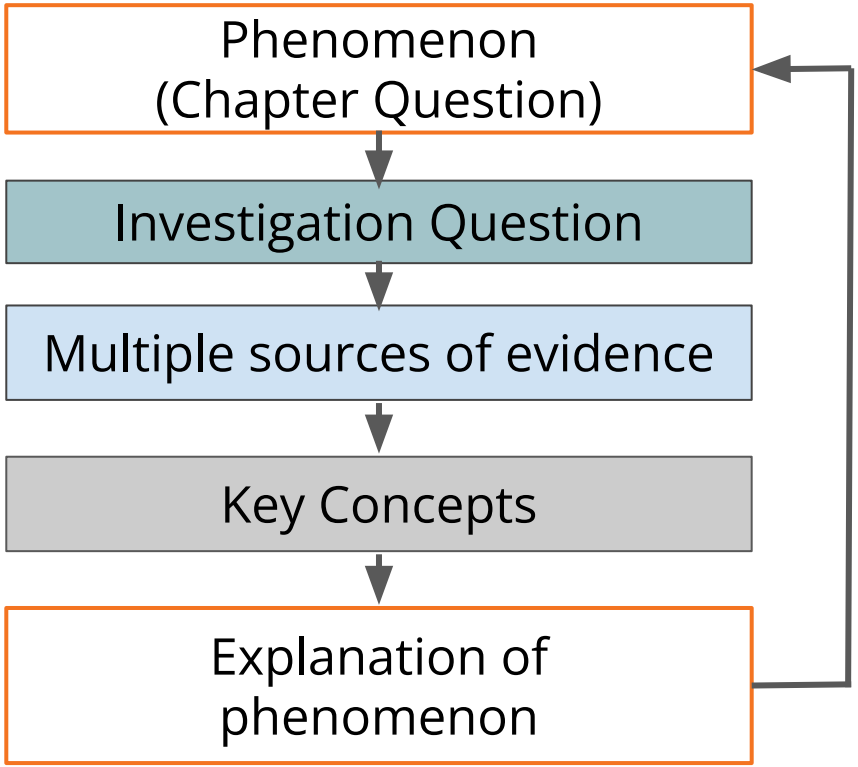
Investigation Question: How do fossils form?



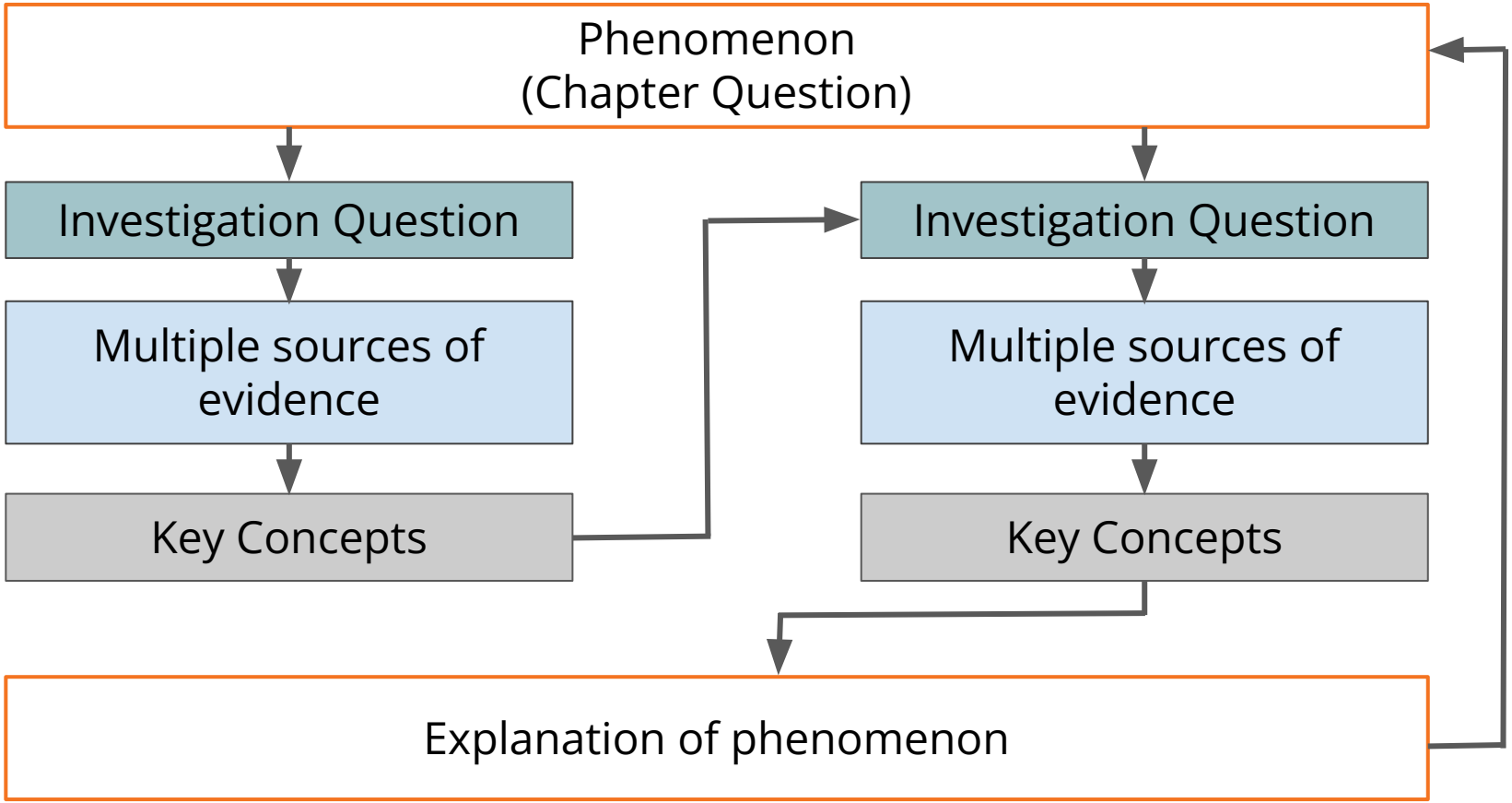
Students figure out: A fossil forms when an organism dies and is covered with sediment that turns into rock.

Coherence Flowchart

A diagram of student learning



Coherence Flowchart



Earth's Features: Mystery in Desert Rocks Canyon

Unit Anchor Phenomenon

Problem students work to solve

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?

Chapter-level Anchor Phenomenon
Chapter 1 Question

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

Investigation Questions

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)

Evidence sources and reflection opportunities

- 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)

- 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)

Key concepts

- 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)

Application of key concepts to problem

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

Explanation that students can make to answer the Chapter 1 Question

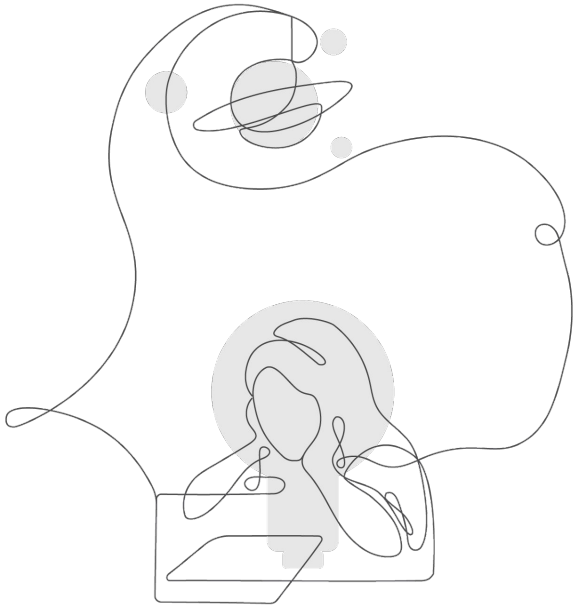
The fossil is the preserved remains of an organism that lived a long time ago. The fossil formed when the organism died and sediments sank through the water and completely covered its body. More and more sediment continued to build up over the body. As more sediment landed on top, it compacted the sediment 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.

Amplify.

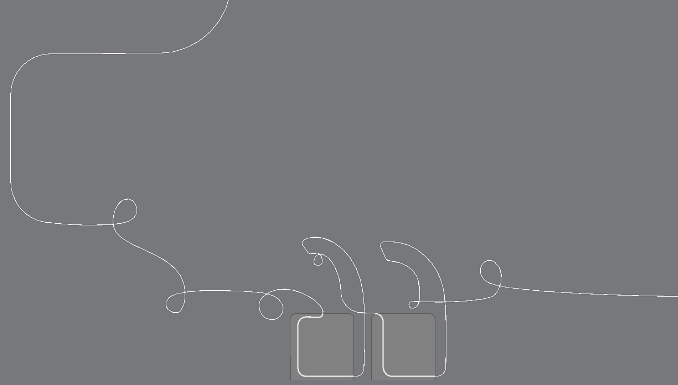
Explore the Coherence Flowchart

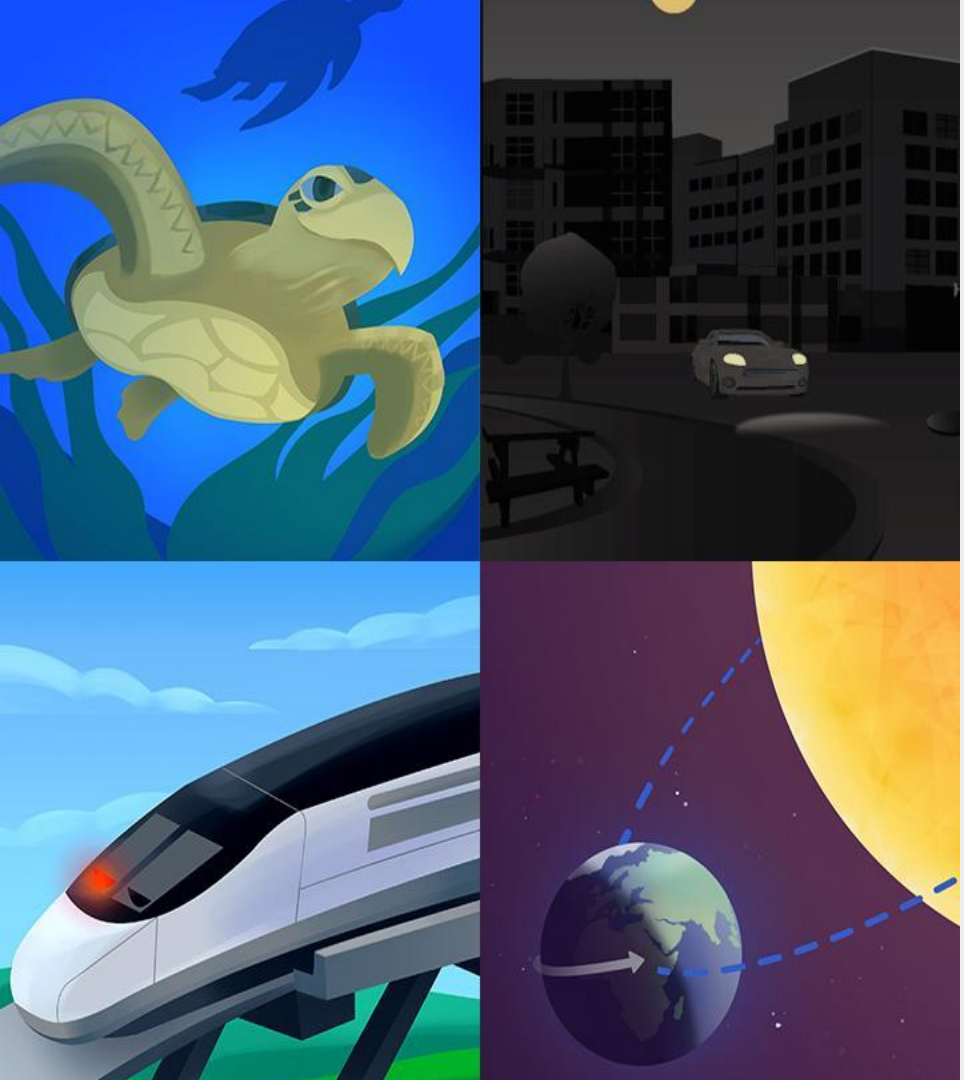
Skim the Chapter 1 Coherence Flowchart of your first unit.

How can the Coherence Flowchart serve you as a planning tool as you begin teaching Amplify Science?



Questions?

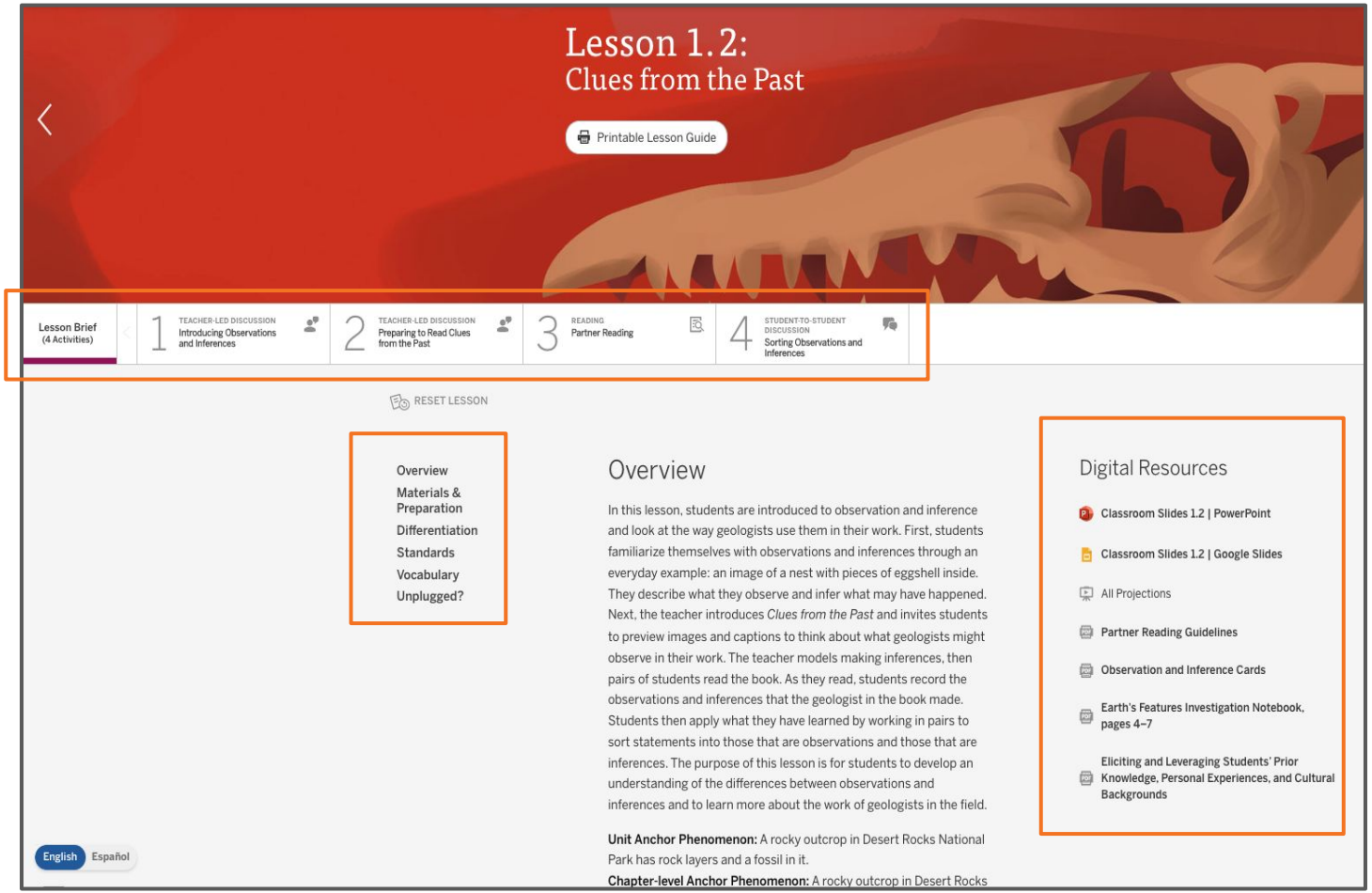




Plan for the day: Part 2

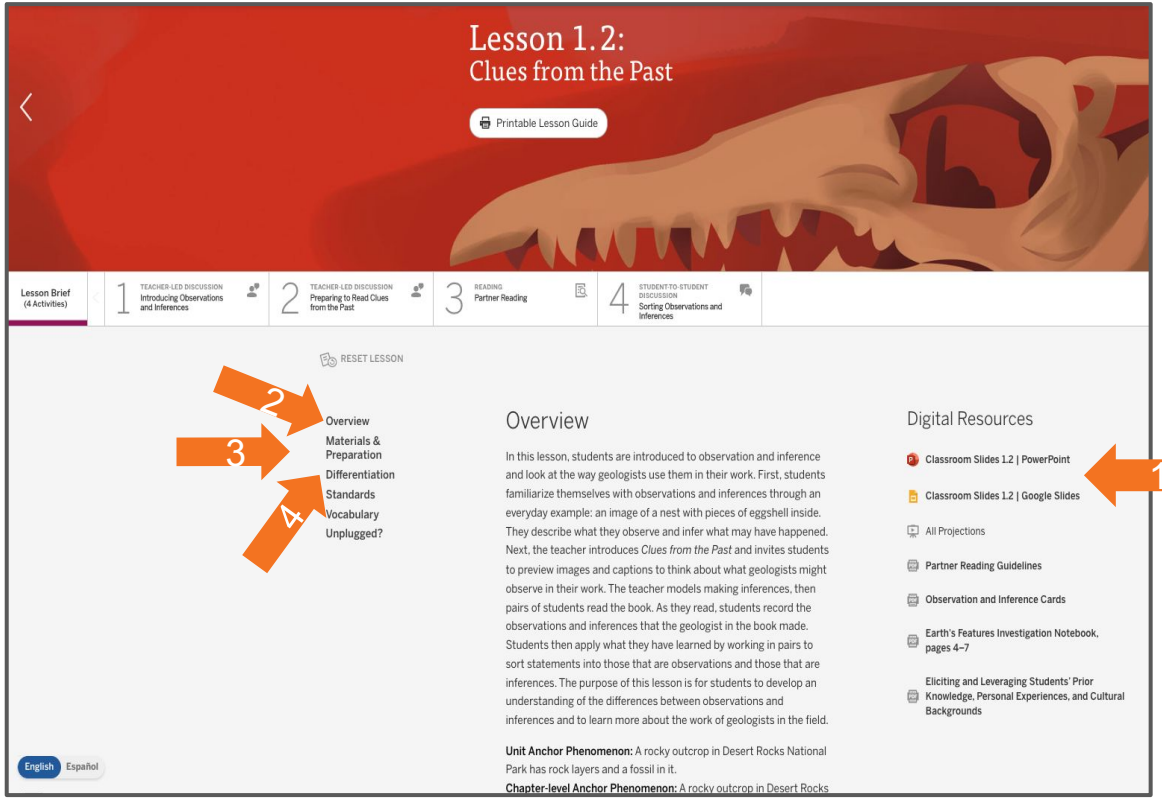
- Teaching and Learning in an Amplify Science Lesson
- Instructional Approach Reflection
- Planning a Lesson
- Closing

Navigate to the Lesson Brief



4 Steps for Starting Your Lesson

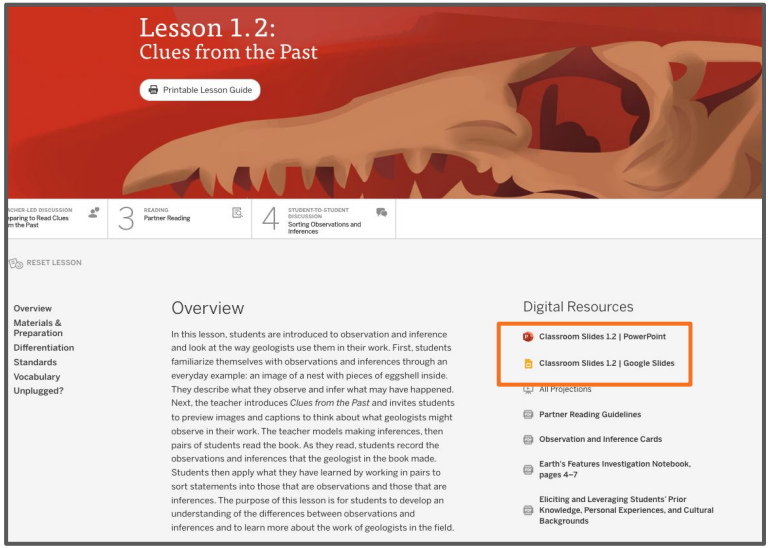
1. Download **Classroom Slides** and review them.
2. Read the **Overview**.
3. Review the **Materials & Preparation** document.
4. Read the **Differentiation** document.



Preparing to teach

Classroom Slides

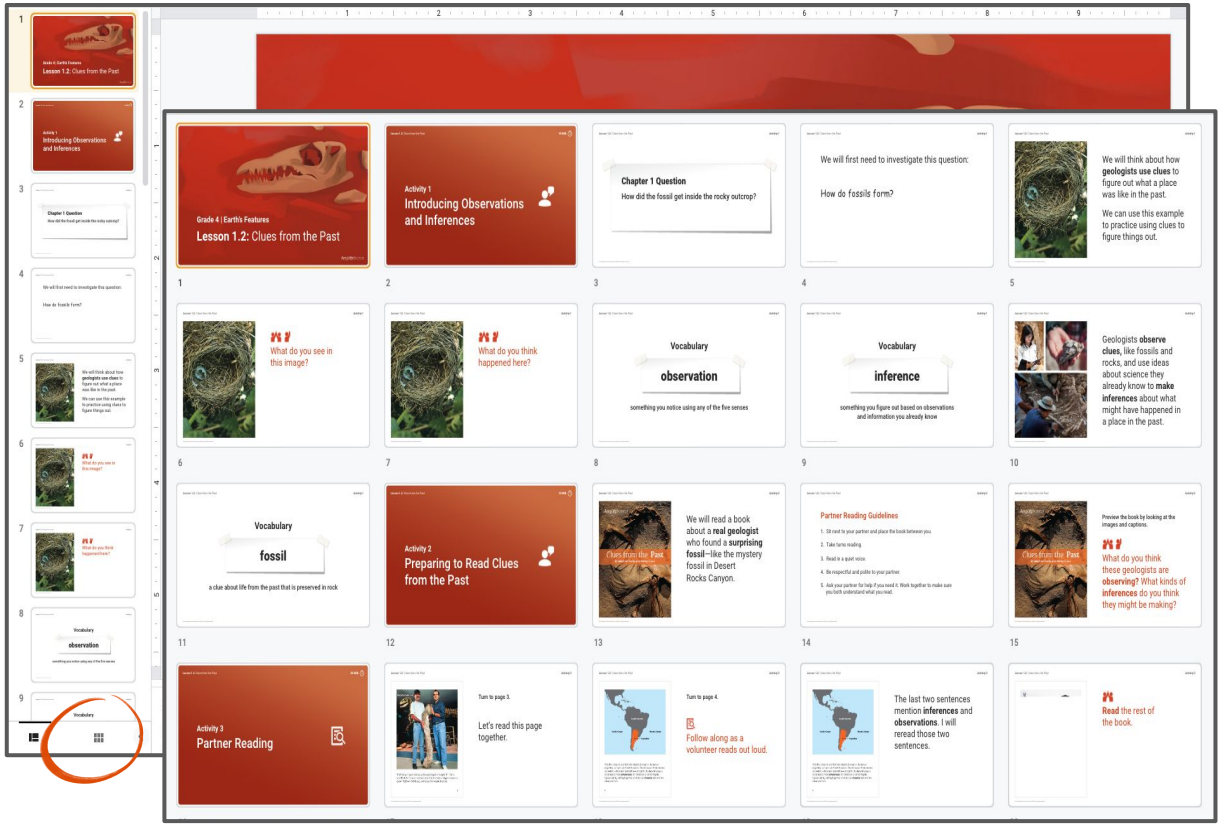
1. Open the **Classroom Slides** under the **Digital Resources**.
2. Read through the Classroom Slides including the **presenter notes** to gain a better understanding of the lesson.
3. **Consider:**
    - What features of the Classroom Slides will support you in teaching this lesson?



Using Classroom Slides as a planning tool

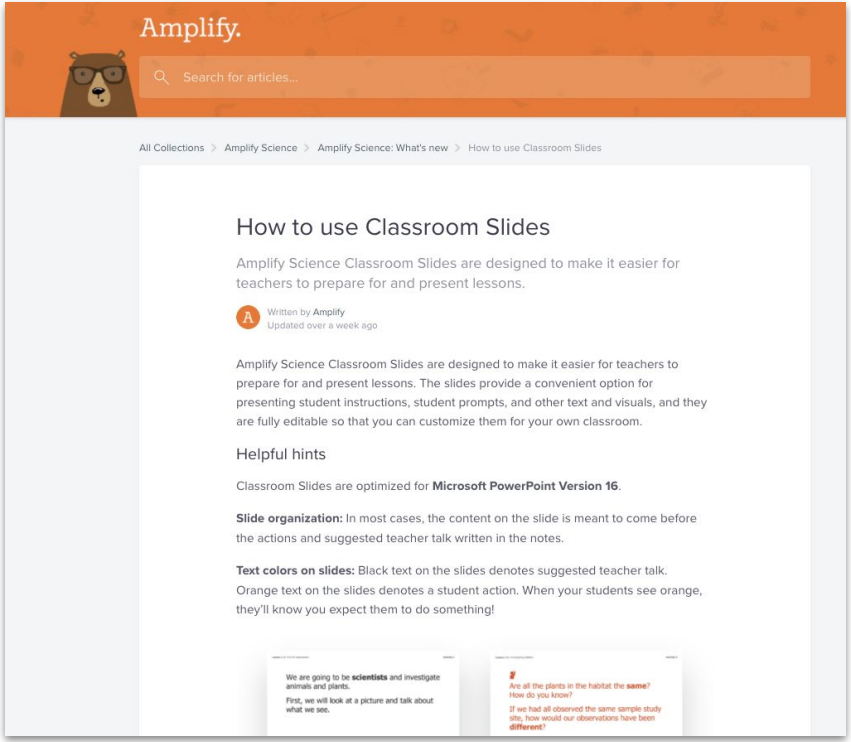
Teacher tip: Classroom Slides are a great visual summary of a lesson. Many teachers download and flip through a lesson's Classroom Slides deck to preview what happens in the lesson.

This is a useful first step for preparing to teach the lesson.



Teaching with Classroom Slides

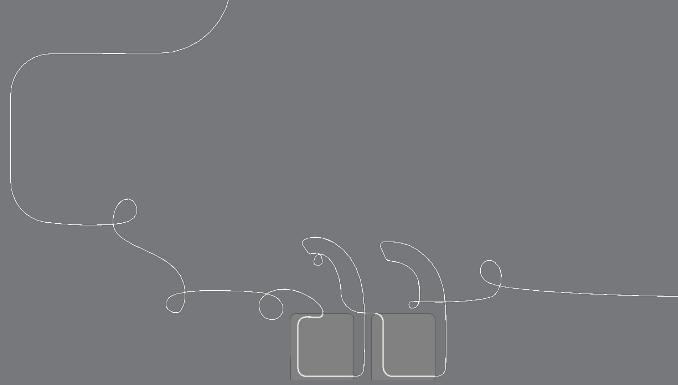
This detailed guide on the Amplify Science Help Site includes tips for teaching with Classroom Slides and information about the different symbols and activity types you'll find in the slide deck.

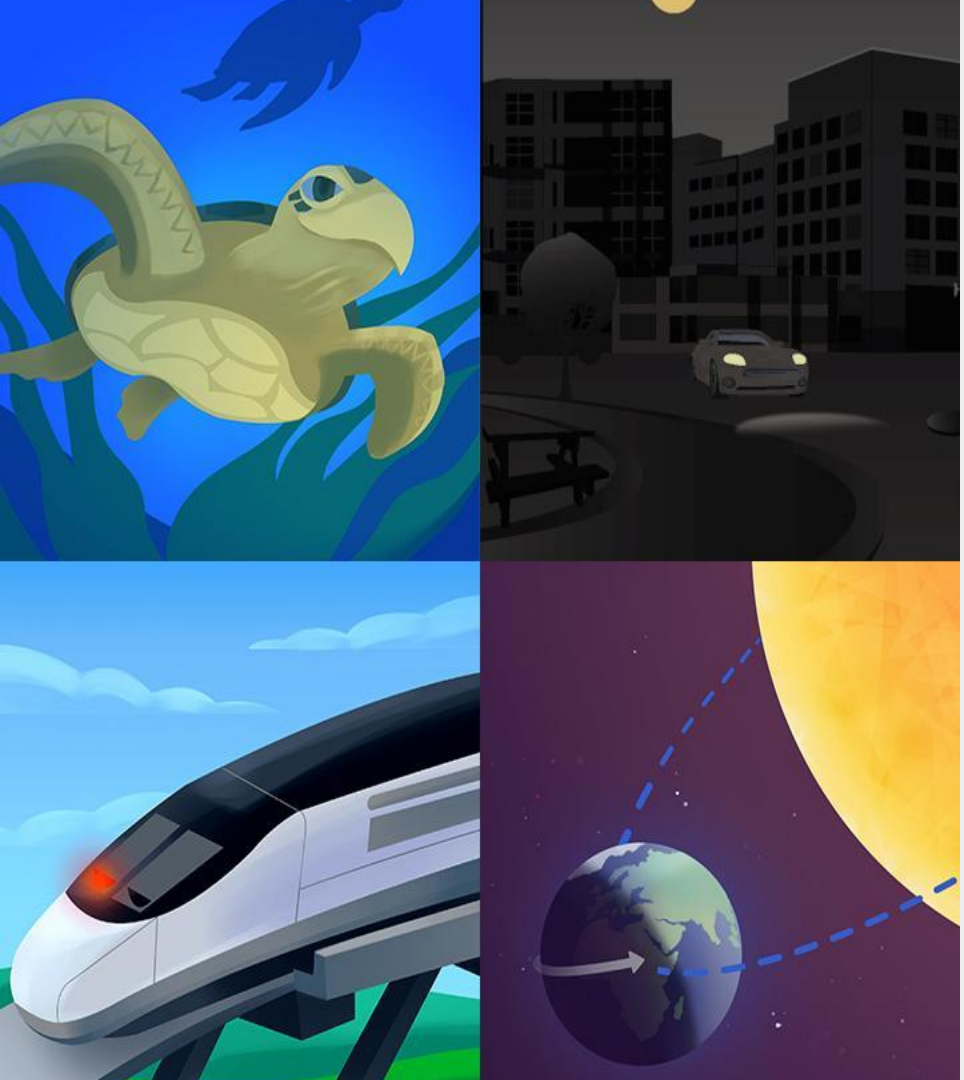


Lesson __	Activity Overview	From the Lesson at a glance in the overview
What is the purpose of this lesson? From the lesson overview	**Activity 1 (##min)**	
What will students learn?	**Activity 2 (##min)**	
3-D Statement (identify SEP, CCC, and DCI): From the lesson standards	**Activity 3 (##min)**	
Student Resources: From the lesson materials and preparation	**Activity 4 (##min)**	
Assessment Opportunities: From the lesson at a glance in the overview or classroom slides	**Activity 5 (##min)**	

Lesson 1.2	Activity Overview	
What is the purpose of this lesson? For students to develop an understanding of the differences between observations and inferences and to learn more about the work of geologists in the field.	**Activity 1 (##min)**	Students are introduced to observations and inferences through a familiar example (10 min)
What will students learn? • An observation is something you notice using any of the five senses. • An inference is something you figure out based on observations and information you already know. • Geologists use observations of fossils to make inferences about organisms that lived long ago. • Making inferences when reading can help you understand informational text. • Scientists use a variety of methods, tools, and techniques when they conduct investigations. • Science findings are limited to what can be answered with evidence.	**Activity 2 (##min)**	Preparing to read *Clues from the Past* (10 min)
3-D Statement (identify SEP, CCC, and DCI): Students obtain and evaluate information from the book *Clues from the Past* to see how geologists use observations of fossils in the present, and cause-and-effect relationships, to make inferences about the past (cause and effect)	**Activity 3 (##min)**	Partner Reading (25 min)
Student Resources: Observation and Inference cards, *Clues from the Past,* Investigation Notebooks	**Activity 4 (## min)**	Sorting Observations and Inferences (15 min)
Assessment Opportunities: Student to student discussion on observations and inferences .	**Activity 5 (##min)**	

Questions?





Plan for the day: Part 2

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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

TOP RATED BY EDREPORTS

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!

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

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

Please provide feedback!

Presenter name:

Workshop title:

Part 1: Unit 3 Internalization

Part 2: Guided Planning (Planning for a Lesson)

Modality:

Remote