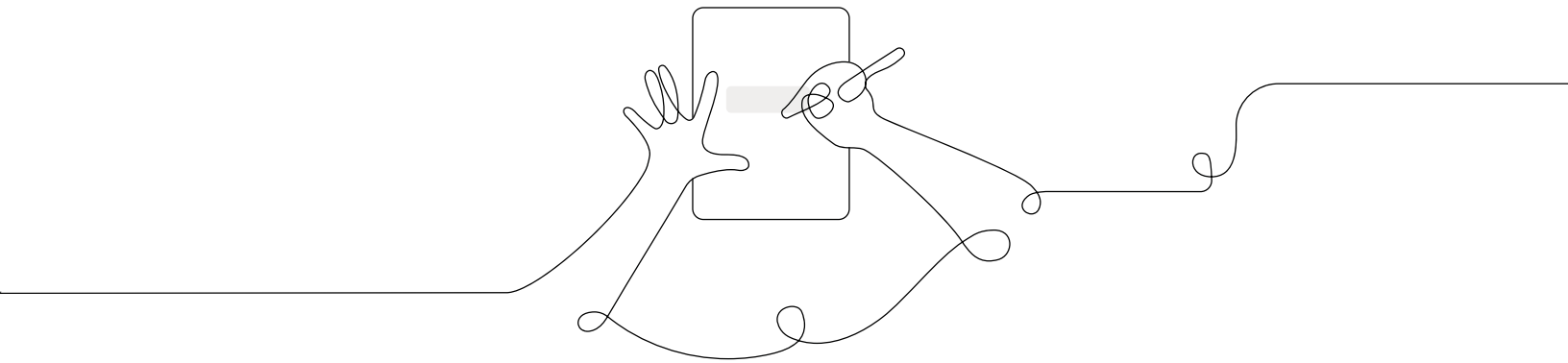


Participant Notebook

Unit Internalization and Guided Planning

Grade 7, Rock Transformations



Unit Guide resources

Once a unit is selected, select **JUMP DOWN TO UNIT GUIDE** in order to access all unit-level resources in an Amplify Science unit.

Planning for the unit

Unit Overview	Describes what's in each unit, the rationale, and how students learn across chapters
Unit Map	Provides an overview of what students figure out in each chapter, and how they figure it out
Progress Build	Explains the learning progression of ideas students figure out in the unit
Getting Ready to Teach	Provides tips for effectively preparing to teach and teaching the unit in your classroom
Materials and Preparation	Lists materials included in the unit's kit, items to be provided by the teacher, and briefly outlines preparation requirements for each lesson
Science Background	Adult-level primer on the science content students figure out in the unit
Standards at a Glance	Lists Next Generation Science Standards (NGSS) (Performance Expectations, Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts), Common Core State Standards for English Language Arts, and Common Core State Standards for Mathematics

Teacher references

Lesson Overview Compilation	Lesson Overview of each lesson in the unit, including lesson summary, activity purposes, and timing
Standards and Goals	Lists NGSS (Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts) and CCSS (English Language Arts and Mathematics) in the unit, explains how the standards are reached
3-D Statements	Describes 3-D learning across the unit, chapters, and in individual lessons
Assessment System	Describes components of the Amplify Science Assessment System, identifies each 3-D assessment opportunity in the unit
Embedded Formative Assessments	Includes full text of formative assessments in the unit
Books in This Unit	Summarizes each unit text and explains how the text supports instruction
Apps in This Unit	Outlines functionality of digital tools and how students use them (in grades 2-5)

Printable resources

Copymaster Compilation	Compilation of all copymasters for the teacher to print and copy throughout the unit
Investigation Notebook	Digital version of the Investigation Notebook, for copying and projecting
Multi-Language Glossary	Glossary of unit vocabulary in multiple languages
Print Materials (8.5" x 11")	Digital compilation of printed cards (i.e. vocabulary cards, student card sets) provided in the kit
Print Materials (11" x 17")	Digital compilation of printed Unit Question, Chapter Questions, and Key Concepts provided in the kit



Unit Map

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

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

Chapter 1: How did the rock of the Great Plains and the rock of the Rocky Mountains form?

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

How they figure it out: They observe rock samples and explore the Simulation, finding different ways to make rock form. They model the formation of sedimentary rocks using hard candy, and view a video showing igneous rock formation as magma cools. They create a visual model showing two different ways rocks can form. They evaluate evidence based on how detailed observations are.

Chapter 2: Where did the magma and sediment that formed the rock of the Great Plains and the rock of the Rocky Mountains come from?

Students figure out: It is possible that the rock of the Great Plains formed from sediment that eroded off the Rocky Mountains. It might also be possible that the rock of the Rocky Mountains formed from the rock of the Great Plains if the Great Plains rock were somehow carried underground to where energy from Earth's interior could melt it into magma. Matter gets transformed by energy, but the same matter is still present. Sediment forms when any type of rock is weathered, a process driven by energy from the sun. Magma forms when any type of rock is melted, a process driven by energy from Earth's interior.

How they figure it out: They find ways to cause magma and sediment to form in the Sim, then observe which of these processes are driven by energy from the Sun and which are driven by energy from Earth's interior. They watch a video that illustrates the processes of weathering and erosion. They read an article about the geologic history of Devils Tower. They model the formation of sediment using hard candy, and watch a video demonstration of a hard candy model of magma formation. They write about ways that different energy sources affect rock and create new visual models. They read and conduct Sim missions related to rocks in Hawaii in order to review chapter content.

**Chapter 3: How could rock from one of the regions have transformed into a different type of rock in the other region?**

Students figure out: The plate motion that occurred near the Great Plains and Rocky Mountains uplifted igneous rock that formed underground. This rock eventually eroded and its sediment formed sedimentary rock in the Great Plains. Plate motion moves rock formations. Subduction moves rock down, below Earth's outer layer. Uplift moves rock upward, toward Earth's surface. Uplift and subduction can expose rock formations to different energy sources, which can transform them. Any type of rock can transform into any type of rock because of plate motion.

How they figure it out: They read an article about the oldest rocks on Earth and how plate motion affects rock transformations. They conduct Sim missions attempting to transform certain types of rock to other types. They engage in a classroom model that illustrates the many possible transformations that rock material may undergo. They write about how rock material may come to be exposed to different types of energy, and therefore undergo different types of transformations, and they create their final visual model.

Chapter 4: Students apply what they learn to a new question—What rock transformation processes are happening on Venus?

Students consider whether rock transformations on Venus are producing mostly sedimentary rocks or mostly igneous rocks. They evaluate and analyze photographic and descriptive evidence, and also analyze evidence about energy sources on the planet. They engage in oral argumentation in a student-led discourse routine called a Science Seminar and then write final arguments.

Guided Unit Internalization

Part 1: Unit-level internalization

Unit title: Rock Transformations

What is the phenomenon students are investigating in your unit?

A rock sample found in the Great Plains and a rock sample found in the Rocky Mountains look different but are composed of a surprisingly similar mixture of minerals. Did the rocks form together and get split apart or did one rock form first and the other rock from from minerals of the fist rock?

Unit Question:

How do rocks form and change?

Student role:

Student geologists

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

The plate motion that occurred near the Great Plains and Rocky Mountains uplifted igneous rock that formed underground. This rock eventually eroded and its sediment formed sedimentary rock in the Great Plains. Plate motion moves rock formations. Subduction moves rock down, below Earth's outer layer. Uplift moves rock upward, toward Earth's surface. Uplift and subduction can expose rock formations to different energy sources, which can transform them. Any type of rock can transform into any type of rock because of plate motion.

What science ideas do students need to figure out in order to explain the phenomenon?

Rocks that form in different ways are different types of rocks. Material for rock formations can come from rock formations that were weathered or melted. Rock formations can move between Earth's surface and its interior, which can lead to their transformation.

Guided Unit Internalization Planner

Unit-level internalization

Unit title:

What is the phenomenon students are investigating in your unit?	
Unit Question:	Student role:
By the end of the unit, students figure out ...	
What science ideas do students need to figure out in order to explain the phenomenon?	

Multi-day planning, including planning for differentiation and evidence of student work

Day _____			
Minutes for science: _____		Minutes for science: _____	
Instructional format: <input type="checkbox"/> Asynchronous <input type="checkbox"/> Synchronous		Instructional format: <input type="checkbox"/> Asynchronous <input type="checkbox"/> Synchronous	
Lesson or part of lesson: Mode of instruction: <input type="checkbox"/> Preview <input type="checkbox"/> Review <input type="checkbox"/> Teach full lesson live <input type="checkbox"/> Teach using synchronous suggestions <input type="checkbox"/> Students work independently using: <input type="checkbox"/> @Home Packet <input type="checkbox"/> @Home Slides and @Home Student Sheets <input type="checkbox"/> @Home Videos		Lesson or part of lesson: Mode of instruction: <input type="checkbox"/> Preview <input type="checkbox"/> Review <input type="checkbox"/> Teach full lesson live <input type="checkbox"/> Teach using synchronous suggestions <input type="checkbox"/> Students work independently using: <input type="checkbox"/> @Home Packet <input type="checkbox"/> @Home Slides and @Home Student Sheets <input type="checkbox"/> @Home Videos	
Students will...	Teacher will...	Students will...	Teacher will...

Look at the *Students will* columns. What are students working in the lesson(s) that you could collect, review, or provide feedback on?

See Some Types of Written Work in Amplify Science to the right for guidance.

If there isn't a work product listed above, do you want to add one? Make notes below.

How will students submit this work product to you?

See the Completing and Submitting Written Work tables to the right for guidance on how students can complete and submit work.

How will you differentiate this lesson for diverse learners? (Navigate to the lesson level on the standard Amplify Science platform and click on differentiation in the left menu.)

Some Types of Written Work in Amplify Science

- Daily written reflections
- Homework tasks
- Investigation notebook pages
- Written explanations (typically at the end of Chapter)
- Diagrams
- Recording pages for Sim uses, investigations, etc

Completing Written Work

- Plain paper and pencil (videos include prompts for setup)
- (6-8) Student platform
- Investigation Notebook
- Record video or audio file describing work/answering prompt
- Teacher-created digital format (Google Classroom, etc)

Submitting Written Work

- Take a picture with a smartphone and email or text to teacher
- Through teacher-created digital format
- During in-school time (hybrid model) or lunch/materials pick-up times
- (6-8) Hand-in button on student platform

Day _____			
Minutes for science: _____ Instructional format: <input type="checkbox"/> Asynchronous <input type="checkbox"/> Synchronous		Minutes for science: _____ Instructional format: <input type="checkbox"/> Asynchronous <input type="checkbox"/> Synchronous	
Lesson or part of lesson: Mode of instruction: <input type="checkbox"/> Preview <input type="checkbox"/> Review <input type="checkbox"/> Teach full lesson live <input type="checkbox"/> Teach using synchronous suggestions <input type="checkbox"/> Students work independently using: <input type="checkbox"/> @Home Packet <input type="checkbox"/> @Home Slides and @Home Student Sheets <input type="checkbox"/> @Home Videos		Lesson or part of lesson: Mode of instruction: <input type="checkbox"/> Preview <input type="checkbox"/> Review <input type="checkbox"/> Teach full lesson live <input type="checkbox"/> Teach using synchronous suggestions <input type="checkbox"/> Students work independently using: <input type="checkbox"/> @Home Packet <input type="checkbox"/> @Home Slides and @Home Student Sheets <input type="checkbox"/> @Home Videos	
Students will...	Teacher will...	Students will...	Teacher will...

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Suggestions for synchronous time

The following are some ideas for making the most of synchronous time with your students. As a general rule, the best way to use your synchronous time is to provide students opportunities to talk to one another, or to observe or visualize things they could not do independently.

Online synchronous time	Notes
<p>Online discussions: It's worthwhile to establish norms and routines for online discussions in science to ensure equity of voice, turn-taking, etc.</p> <p>Digital tool demonstrations: You can share your screen and demonstrate, or invite your students to share their screen and think-aloud as they use a Simulation or other digital tool.</p> <p>Interactive read-alouds: Screen share a digital book or article, and pause to ask questions and invite discussion as you would in the classroom.</p> <p>Shared Writing: This is a great opportunity for a collaborative document that all your students can contribute to.</p> <p>Co-constructed class charts: You can create digital charts, or create physical charts in your home with student input.</p>	

Adapting the Amplify Science Approach for Remote Learning

In Amplify Science units, students figure out phenomena by using science and engineering practices. They gather evidence from multiple sources and make explanations and arguments through multiple modalities: doing, talking, reading, writing, and visualizing. They also make their learning visible by posting key concepts on the classroom wall. While we have retained this core approach in the @Home Lessons, enacting it at home will require adaptations.

The @Home Lessons provide general guidance for these adaptations, but you may need to set up expectations for specific routines or provide additional support to your students. Below are ideas for how different aspects of the Amplify Science approach might be adapted for your learners' particular contexts.

Student talk options

- Talk to a member of their household about their ideas.
- Call a friend or classmate and discuss their ideas.
- Talk in breakout groups in a video class meeting.
- Use asynchronous discussion options on technology platforms.

Student writing options

- Write in a designated science notebook.
- Photograph writing and submit digitally.
- Complete prompts in another format. (Teachers can convert prompts so they are completed in an on-line survey or an editable document so students can submit digitally.)
- Submit audio or video responses digitally, rather than submit a written response.
- Share a response orally with a family member or friend with no submission required.
- For students with technology access, complete written work in the students' Amplify accounts (links to corresponding student activities are provided in the @Home Slides).

Student reading options

- Read printed version of article, included with @Home Packets. (Note: although the articles are originally in color, they are provided in the @Home Packets in grayscale for ease of copying. Most articles translate well into grayscale but there will be some exceptions).

- Read printed or PDF version of article, included with @Home Student Sheets.
- Listen to the article being read aloud using the audio feature in the Amplify Science Library or read articles in digital format via the Amplify Science Library (links are provided in the @Home Slides).
- Read with a partner, classmate, or someone from their home.

Hands-on activity options

- Do the activity with simple materials students are likely to have at home. (For activities where this is feasible, instructions are provided.)
- Watch a video. (For some hands-on activities in the @Home Units, a video / images of the investigation are provided.)
- Do the activity using kit materials if available. For example,
 - If possible, send home materials to students who need them.
 - If you have access to your Amplify Science kit, and have opportunities to teach synchronously, demonstrate some hands-on activities with student input.

Classroom wall options

The classroom wall, which provides an important reference for students to track and reflect on their developing understanding of the unit's anchor phenomenon and content, has been reimagined as an @Home Science Wall. A complete list of Chapter Questions, key concepts, and vocabulary that have been introduced so far are provided in the last lesson of each chapter. To enhance students' experience of the @Home Science Wall, you could have students:

- Draw a picture or write their ideas on their @Home Science Wall pages.
- Highlight each question, key concept, or word that is introduced.
- Cut out each question, key concept, or word. These can be then posted on a wall, large sheet of paper, or refrigerator at home.

Additionally, if you are meeting with your class remotely, you could create a virtual @Home Science Wall.

Adaptations of other Amplify Science routines

- **Reading support.** In Amplify Science 6–8, support for student reading includes: teacher modeling; structured paired and whole group discussion of texts; multiple readings of text; an audio feature in the Amplify Library; as well as suggestions for additional

strategies for students who need more reading support. Some suggestions to offer similar supports with the @Home Lessons are:

- Meet virtually as a class or in small groups and read the first part of the article with students, modeling how you would read the text.
- Ask student pairs to meet after reading to discuss their annotations.
- Have each student meet with someone in their home to read at least some of the text together and/or discuss their annotations after reading.
- **Talk routines.** In Amplify Science units students periodically talk in small groups using routines such as Word Relationships and Write and Share. You may consider including and adapting these routines by having students meet and talk to their peers in small groups or asking each student to conduct the routine with someone in their home.
- **Science Seminar.** Each core unit in Amplify Science 6–8 culminates with a Science Seminar, which is a whole-class, student-led argumentation routine. An adapted version of the Science Seminar has been included in the @Home Units. Some suggestions for implementing this are:
 - Hold your Science Seminar in class, if you are meeting in person some of the time.
 - Hold Seminars with your whole class, remotely. Students can participate all at the same time, or you might break the group up in thirds or in half and have the students who are not talking take notes using the Science Seminar Observations sheet.
 - Hold Seminars with pairs or small groups meeting on the phone, on video calls, or in virtual breakout rooms.
 - Have students talk to someone in their household about the Science Seminar evidence and claims.

@Home Units assessment considerations

Each Chapter Outline contains considerations for assessment and feedback in the Amplify Science units, and in some cases, the pre-unit and end-of-unit assessments. Generally, we recommend the following:

- You may need to adapt the format in which you collect student work. See the “Student writing options” above.
- When providing feedback to students, you may wish to focus on how students are attending to the Investigation and/or the Chapter Questions, if they are using evidence they have gathered to support their responses to questions, and if they are using appropriate unit vocabulary in their responses.

@Home Units guidance for synchronous and in-person learning

Each @Home Lesson contains suggestions for using these asynchronous resources in conjunction with virtual or in-person class sessions. If you are able to choose particular lessons to conduct together with students, we recommend:

- Holding discussions to engage students in figuring out the unit phenomenon.
 - At the beginning of each chapter so students can share their initial ideas or evolving ideas about the unit phenomenon.
 - At the end of the chapter so students can talk as they make sense of evidence, and/or synthesize various sources of information, and make an explanation or argument about the phenomenon.
- If you have access to kit materials, you can conduct hands-on demonstrations when hands-on materials are unavailable to students. Solicit student input as you demonstrate.
- If students do not have access to technology at home, when in-person, you can provide time for them to make observations and discuss ideas related to the simulations and digital tools.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.