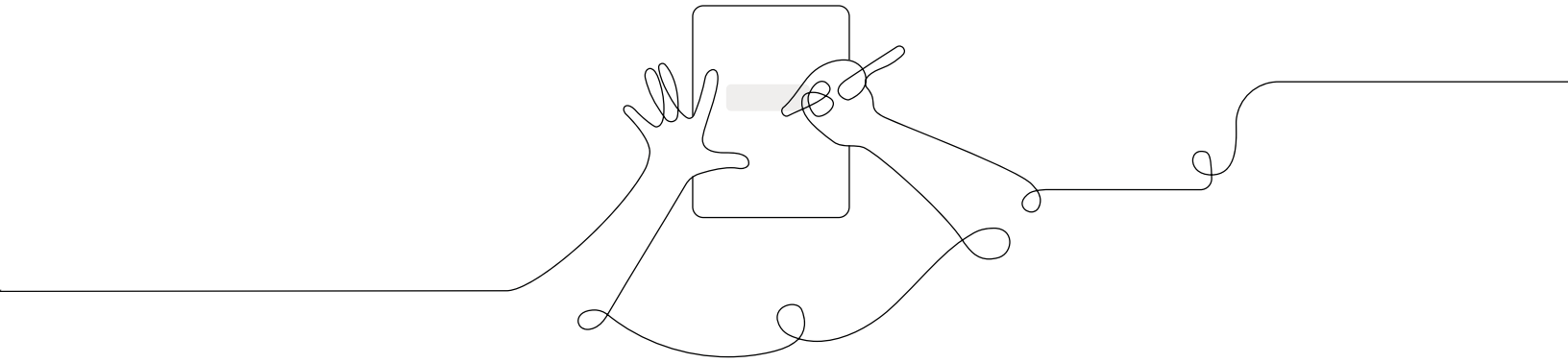
AmplifyScience

Participant Notebook

Grade 1: Spinning Earth
Unpacking for Hybrid Learning



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 doesn't the sky always look the same?

As sky scientists, students explain why a boy living in a nearby place sees different things in the sky than his grandma who lives in a faraway place. Students record, organize, and analyze observations of the sun and other sky objects as they look for patterns and make sense of the cycle of daytime and nighttime.

Chapter 1: Why did the sky look different to Sai than to his grandma?

Students figure out: Sai and his grandma saw different things at the same time because they live in different places. When it is daytime for Sai, it is nighttime for his grandma. When Sai sees the sun, Sai's grandma sees the stars.

How they figure it out: Students make observations of the daytime sky and read about observations of the nighttime sky. They use evidence from live webcams to compare and contrast what people in different places on Earth see in the sky at the same time. They begin to notice patterns in what they see in the sky.

Chapter 2: Why was it daytime for Sai when it was nighttime for his grandma?

Students figure out: It was daytime for Sai when it was nighttime for his grandma because Earth is shaped like a ball, and Sai and his grandma live on different parts of Earth. When the place where Sai lives is facing the sun, the place where his grandma lives is facing away from the sun.

How they figure it out: Students watch videos of Earth to develop an understanding that Earth's shape is round like a ball. Students use globes and their own heads as models of Earth to observe how different parts of Earth face the sun at different times. They conclude that it is daytime in places on Earth that are facing the sun and nighttime in places on Earth that are not facing the sun.

Chapter 3: Why did daytime change to nighttime while Sai talked on the phone?

Students figure out: It changed from daytime to nighttime because Earth is spinning. When Sai and his grandma started talking, he saw the sun because the place on Earth where he lives was facing the sun. As Earth spins, the place where Sai lives moves to face away from the sun, so it changes to nighttime.

How they figure it out: Students observe the position of the sun through the course of a day and record this data on their Sky Mural. They use these observations and view time-lapse videos to develop an understanding that Earth spins. Students then engage in a hands-on activity to conclude that, as Earth spins, we face different directions, so what we see in the sky changes.

Chapter 4: What will Sai see in the sky when he calls his grandma tomorrow?

Students figure out: When Sai talks on the phone to his grandma at the same time tomorrow, he will see the same thing he saw in the sky today. The sun makes the same pattern in the sky every day because Earth spins one full time every day. This pattern lets us predict that Sai will see the sunset in the evening.

How they figure it out: Students make additional observations of the sky, both at the same time as previous observations and at sunset. They then record this new data on the Sky Mural. They organize this data in a new way in order to arrive at the understanding that the sun makes the same pattern in the sky every day because Earth spins one full time every day.

Chapter 5: Why was it nighttime for Sai when he called his grandma during the winter?

Students figure out: It was nighttime when Sai called his grandma during the winter because in winter, daytime is shorter and nighttime is longer than in other seasons.

How they figure it out: Students gather evidence about the seasons by reading and discussing a series of texts. They observe that there is a seasonal pattern to the length of daytime and nighttime over the course of a year.

Progress Build

A Progress Build describes the way in which students' explanations of the central phenomenon should develop and deepen over the course of a unit. It is an important tool in understanding the design of the unit and in supporting students' learning. A Progress Build organizes the sequence of instruction, defines the focus of the assessments, and grounds inferences about students' understanding of the content, specifically at each of the Critical Juncture Assessments found throughout the unit. A Critical Juncture Assessment provides information to help guide decisions related to the instruction designed to address specific gaps in students' understanding. This document will serve as an overview of the *Spinning Earth: Investigating Patterns in the Sky* Progress Build. Since the Progress Build is an increasingly complex yet integrated explanation, we represent it below by including the new ideas for each level in bold. Depending on the standards for a given grade level, a unit may include additional supporting content; however, the Progress Build serves as the conceptual core of the unit.

In the *Spinning Earth* unit, students will learn to construct scientific explanations about why we observe daily cycles of day (when we see the sun in an arcing path across the sky) and night (when we see stars but not the sun).

Prior knowledge (preconceptions): Students are assumed to know that the sun is a very bright, relatively large object sometimes seen in the sky and that stars are bright, small objects seen in a darker sky.

Progress Build Level 1: The sun is visible in the daytime; stars are visible in the nighttime.

We see different things in the sky during the daytime when the sky is bright and during the nighttime when the sky is dark. When it is daytime, we can see the sun. When it is nighttime, we can see the stars. At any given time, it is daytime for people in some places on Earth and nighttime for people in other places.

Progress Build Level 2: Facing or facing away from the sun changes what we see in the sky.

We see different things in the sky during the daytime when the sky is bright and during the nighttime when the sky is dark. When it is daytime, we can see the sun. When it is nighttime, we can see the stars. At any given time, it is daytime for people in some places on Earth and nighttime for people in other places. **Earth is round like a ball. In places on the part of Earth *facing* the sun, people see the sun, and it is daytime. In places on the part of Earth facing *away* from the sun, people can see stars, and it is nighttime.**

Progress Build Level 3: Earth spins.

We see different things in the sky during the daytime when the sky is bright and during the nighttime when the sky is dark. When it is daytime, we can see the sun. When it is nighttime, we can see the stars. At any given time, it is daytime for people in some places on Earth and nighttime for people in other places. Earth is round like a ball. In places on the part of Earth *facing* the sun, people see the sun, and it is daytime. In places on the part of Earth facing *away* from the sun, people can see stars, and it is nighttime. **Earth spins slowly in place. As Earth spins while the place in which we live is *facing* the sun, we see the sun in different places in the sky. As Earth spins while the place in which we live faces *away* from the sun, it changes from daytime to nighttime.**

Progress Build Level 4: Earth spins continuously.

We see different things in the sky during the daytime when the sky is bright and during the nighttime when the sky is dark. When it is daytime, we can see the sun. When it is nighttime, we can see the stars. At any given time, it is daytime for people in some places on Earth and nighttime for people in other places. Earth is round like a ball. In places on the part of Earth *facing* the sun, people see the sun, and it is daytime. In places on the part of Earth facing *away* from the sun, people can see stars, and it is nighttime. Earth spins slowly in place. As Earth spins while the place in which we live is *facing* the sun, we see the sun in different places in the sky. As Earth spins so the place in which we live faces *away* from the sun, it changes from daytime to nighttime. **Earth makes one full spin each day. We see the sun in the same place in the sky at the same time each day because a whole day has passed, and Earth has spun all the way around to face the same way again.**

Applying conceptual understanding to explain the phenomenon

Use ideas from the Progress Build and Unit Map to make notes about the conceptual and explanatory builds in your unit.

	Science concepts	Explanation of the phenomenon
	Students figure out...	*So they can explain...*
Chapter 1	By using evidence from their own observations in the sky and live webcams to compare and contrast what people in different places on Earth see in the sky at the same time.	Why the sky looked different to the young boy than his grandma. when they talked on the phone.
Chapter 2	By using evidence from videos, globes, and their own head as models they conclude that it is daytime in places that are facing the sun. and nighttime in places that are not facing the sun.	That it is daytime in places facing the sun, and nighttime in places not facing the sun.
Chapter 3	Noticing that the sun is in different places in the sky and appears to go below the horizon, students go on to observe and record the sun's position in the sky throughout the day. They also observe time-lapse videos for data.	That it changed from daytime to nighttime because the Earth is spinning. As Earth spins, we face different directions, so what we see changes in the sky.
Chapter 4	By making additional observations of the sky, both at the same time as previous observations and at sunset.	That we see the sun make the same pattern in the sky each day because Earth is always spinning.

Applying conceptual understanding to explain the phenomenon

Use ideas from the Progress Build and Unit Map to make notes about the conceptual and explanatory builds in your unit.

	Science concepts	**Explanation of the phenomenon**
	Students figure out…	*So they can explain…*
Chapter 1		
Chapter 2		
Chapter 3		
Chapter 4		
Chapter 5		

Amplify Science@Home resources reference

Use this guide to keep track of the different resources available for remote and hybrid learning.

Instructional materials: Click Remote and hybrid learning resources, then select your grade level from the dropdown menu. Select your unit.	
@Home Unit resources: These will appear when you select your unit.	
Teacher Overview	General information for teaching with @Home Units, planning information, chapter and lesson outlines
Lesson Index	Lists the original Amplify Science lessons associated with each @Home lesson, and the Investigation Notebook pages, copymasters, and print materials associated with the @Home Unit Student Sheets
Family Overview	Information to send home to families to help them support students with remote learning
Student lesson materials for @Home Units	Printable or digital lessons condensed to be about 30 minutes long. You can access compilations of all student materials for your unit, or select from individual lessons.
@Home Video resources: After selecting your grade level and unit, select the @Home Videos tab below your unit title.	
@Home Video links	Links to video lessons that include all activities from the original units. Lesson playlists are on YouTube, and they autoplay in a playlist form.
Additional remote and hybrid instructional materials: These can be accessed from the tabs below your unit title.	
Hands-on investigations support	Videos of every unit's hands-on activities (note, these videos also appear in the student lesson materials).
Read-aloud videos	Link to a YouTube playlist of read-aloud videos of all books in your unit.
Orientation and Tutorials: Click Remote and hybrid learning resources, then select your grade from the dropdown menu. Click Orientation and Tutorials. You'll not only find videos to help you use the resources, but also videos you can share with students and caregivers.	

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
Online discussions: It's worthwhile to establish norms and routines for online discussions in science to ensure equity of voice, turn-taking, etc. **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. **Interactive read-alouds**: Screen share a digital book or article, and pause to ask questions and invite discussion as you would in the classroom. **Shared Writing:** This is a great opportunity for a collaborative document that all your students can contribute to. **Co-constructed class charts:** You can create digital charts, or create physical charts in your home with student input.	

Questioning Strategies for Grades K–1

Overview of the Role of Open-Ended Questioning

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

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

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

Open-Ended Questions to Facilitate Student Thinking and Discourse

Questions to assess students' knowledge and skills:

- Why do you think X?
- How did you (or Could we) figure that out?
- What are you wondering?
- What questions do you have?
- Can you give an example of X?

Questions to promote student-to-student discourse:

- Do you agree or disagree with (that idea)? Why?
- Can you add to what (name of student) shared?

Questions to guide student learning:

- What did you notice?
- What else do we need to figure out?
- How are X and Y similar/different?
- What does this remind you of?

Activity Types Within the Amplify Science Curriculum That Are Especially Suited for Additional Teacher Questioning

The activity types listed below are student-centered and often contain prompts for pairs or small groups of students to use to discuss content or to vet evidence together. As you circulate through the classroom during these activities, you can use the open-ended questions to assess students' knowledge and skills, promote student-to-student discourse, and guide student learning.

- Hands-on activities
- Partner browsing of unit texts
- Discussion before/during/after reading unit texts
- Discussion of photographs and videos
- Discourse routine: Shared Listening
- Card activities (e.g., sorting, sequencing)

Lesson planning with @Home Units

Day Monday	Day Tuesday
Minutes for science: 30	**Minutes for science:** 30
Lesson or part of lesson: @Home Lesson 1 slides 1-19 **Purpose or big idea:** Students make and share observations about sky images. They are introduced to their role. They are also introduced to the Unit Question	**Lesson or part of lesson:** @Home Lesson 1 slides 21-33 **Purpose or big idea:** Students will record observations from the sky.
Students will... -observe various sky images and discuss how they are different during the daytime and the nighttime. - be introduced to the Unit Question. - be introduced to their role as Sky Scientists. - be introduced to the problem we will help solve.	**Teacher will...** -Show the various images and lead a discussion around those images. -introduce the Unit Question & Chapter Question. Will introduce the student role. -Will introduce the problem the students will solve.
Students will... -discuss the content from the images they observed in previous lesson. -watch a video on how to record what they observe. - student will record their observations by looking out the window or going outside with a caregiver. -learn the new vocabulary word "record".	**Teacher will...** -review student role and problem. -review content of the images that students viewed. -introduce the Investigation Question. -introduce a video on how to draw for to record data. -introduce the student sheet to draw their observations.. -Vocab routine-"record"
Additional notes:	**Additional notes:** -Students can make an additional observation of the sky at a later time in the day to practice recording observations. -Share folktales from other cultural backgrounds about the sun and the moon.

Lesson planning with @Home Units

Day _____		**Day _____**	
Minutes for science: _____		**Minutes for science: _____**	
Lesson or part of lesson: **Purpose or big idea:**		**Lesson or part of lesson:** **Purpose or big idea:**	
Students will…	**Teacher will…**	**Students will…**	**Teacher will…**
Additional notes:		**Additional notes:**	

Notes