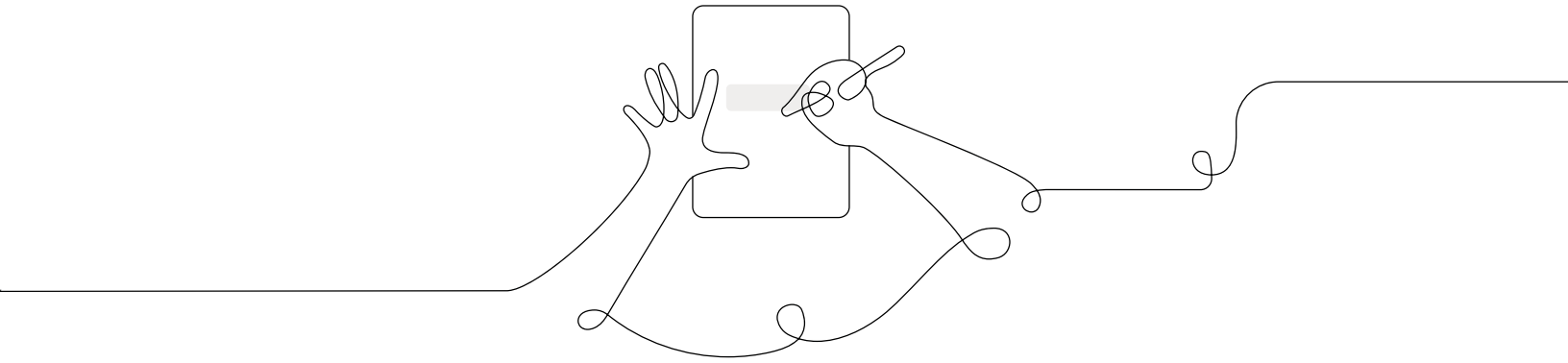
AmplifyScience

Participant Notebook

Grade K: Sunlight and Weather
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 are the playgrounds at two schools different temperatures? Why does one playground flood?

The students at Woodland and Carver Elementary schools are not comfortable outside during their recess times. The Carver students are too cold in the morning, and the Woodland students are too hot in the afternoon. The school principals need student weather scientists to help them explain the difference in playground temperatures. Students gather data from models of the sun and of Earth's surface and observe their own playgrounds to figure out how sunlight causes changes in the temperature of different surfaces. Students then use models to figure out why Woodland's playground sometimes floods.

Chapter 1: What is the weather like on the playgrounds?

Students figure out: The weather at Carver Elementary and Woodland Elementary is similar. Both schools have many sunny days and some cloudy, windy, or rainy days. The type of weather at each school must not be causing the difference in their playgrounds' temperatures.

How they figure it out: Students learn to describe types of weather, then observe and record the weather at their own school. They read a book that helps them describe temperature and use thermometers to take measurements. Students then construct graphs to analyze weather data from each school.

Chapter 2: Why do the playgrounds get warm?

Students figure out: The surfaces of the playgrounds get warm because sunlight shines on their surfaces during the day.

How they figure it out: Students use models of the sun and of Earth's surface to measure the temperature of a surface when light is and is not shining on it. Students read about models and how scientists use them. Students measure the temperature of their own playground surface in sunlight and in shade and they act out how sunlight shining on a surface makes the surface warmer.

Chapter 3: Why are the playgrounds warmer in the afternoon?

Students figure out: The playgrounds at both schools are warmer in the afternoon than in the morning because sunlight has been shining on the surfaces for a longer time.

How they figure it out: Students use models to measure the temperature of a surface as light shines on it for different lengths of time. They analyze morning and afternoon temperature data from their own playground and act out how sunlight shining on a surface over time makes it get warmer and warmer.

Chapter 4: Why is Woodland Elementary School's playground always warmer during recess?

Students figure out: Woodland Elementary's playground has a darker surface than Carver Elementary's playground. Woodland's playground is warmer because dark surfaces get warmer than pale surfaces when the sun shines on them.

How they figure it out: Students use models to measure the temperature of dark and pale surfaces as light shines on them. Students also read a book about a lizard who travels to different surfaces throughout the day. Students compare the temperatures of pale and dark surfaces on their own playgrounds and evaluate how possible solutions would affect the temperature on each playground.

Chapter 5: Why does only Woodland Elementary School's playground flood?

Students figure out: Woodland's playground floods after severe rain because it has a solid surface that does not absorb water, while Carver's playground has a gravel surface that rainwater can soak into.

How they figure it out: Students use models to test four differences between the two playgrounds that could cause flooding. They evaluate solutions that would help Woodland prepare for severe rain in the future and create posters describing preparations for other kinds of severe weather.

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 *Sunlight and Weather: Solving Playground Problems* 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 *Sunlight and Weather*, students will learn to construct scientific explanations for why a dark Earth surface is warmer than a pale Earth surface, even as both surfaces get warmer over the course of the day.

Prior knowledge (preconceptions): Students are assumed to be generally aware that the sun is in the sky during the daytime. They are expected to have some experience with different aspects of weather including warmer and cooler temperatures, clouds, wind, rain, and perhaps snow. They may have some experiences with touching or walking on surfaces that are very hot due to time in the sunlight and/or darker color, such as sand at the beach or asphalt.

Progress Build Level 1: Surfaces get warm in sunlight.

When light from the sun shines on a surface, the surface gets warmer.

Progress Build Level 2: Temperature increases with time in sunlight.

When light from the sun shines on a surface, the surface gets warmer. **The longer that sunlight shines on the surface, the warmer it gets.**

Progress Build Level 3: Dark-colored surfaces get warmer in sunlight.

When light from the sun shines on a surface, the surface gets warmer. The longer that sunlight shines on the surface, the warmer it gets. **If the surface is a dark color, it will get warmer than a surface that is a pale color when sunlight shines on it.**

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	How to describe weather and temperature by reading a book. They observe and record weather at their own schools first. Students then construct graphs to analyze weather data from each school.	The type of weather at each school (Carver Elementary and Woodland Elementary) must not be causing the difference in the playgrounds' temperatures.
Chapter 2	Students investigate the process by measuring the temperature of a surface when light is and is not shining on it.	That the surfaces of the playgrounds get warm because sunlight shines on them during the day.
Chapter 3	Students use models to measure the temperature of a surface as light shines on it for different lengths of time. They do this by measuring and analyzing data from their own playground.	The playgrounds at both schools are warmer in the afternoon than in the morning because sunlight has been shining on the surfaces for a longer time..
Chapter 4	Students gather evidence by measuring the temperature of dark and pale surfaces as light shines on them. Students compare the temperatures of pale and dark surfaces on their own playground.	Woodland Elementary's playground, which has a darker surface, is warmer because dark surfaces get warmer than pale surfaces when the sun shines on them.

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 1-25 **Purpose or big idea:** Introduce the student role of Weather Scientist. Read aloud What is the Weather Like Today?.	**Lesson or part of lesson:** @Home Lesson 1 slides 16-25 **Purpose or big idea:** Making objects start to move.
Students will... -View slides and learn about their role as weather scientists. -Students will participate in predicting types of weather during the read aloud, What is the Weather Like Today?. **Teacher will...** -Teacher will introduce their role as Weather Scientists. -Teacher will lead the class through the unit question and an investigation question. -Teacher will read aloud using the strategy of predicting.	**Students will...** -Students will participate in a Think and Point Activity. They will show and say the type of weather they see on the slide.. -Students will participate in a Weather Body Movement Activity. They will show different body movements for different kinds of weather. **Teacher will...** -Begin the lesson by reviewing the previous days content. -model how to look at the slide, "Think" what type of weather it is showing, then point to the corresponding picture.. -Lead Body Movement Activity. -discuss first concept.
Additional notes: -Assign the read-aloud version of the book home to review what was read in the lesson. -Assign and create simple pictures of cloudy, rainy, windy, sunny, and snowy for the "Think and Point" activity for tomorrow.	**Additional notes:** -Assign students to draw a picture of what the weather's like today.

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