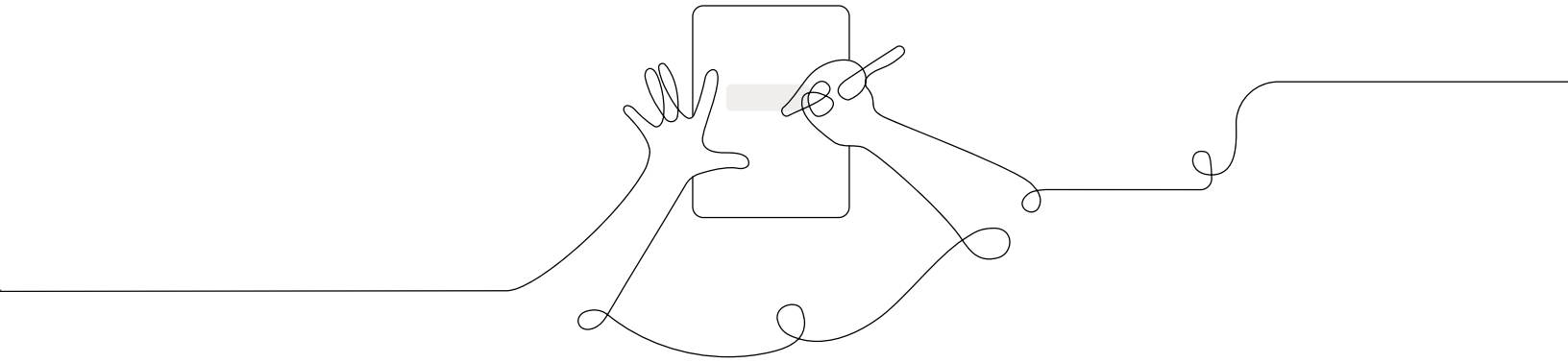
AmplifyScience

Participant Notebook

Grade 2: Plant and Animal Relationships
Unit 1 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

What is happening to the chalta trees in the Bengal Tiger Reserve?

In their role as plant scientists, students figure out why there are no new chalta trees growing in the Bengal Tiger Reserve, which is part of a broadleaf forest. Students investigate what chalta trees need to survive, and then they collect and analyze qualitative and quantitative data to solve the mystery.

Chapter 1: Why aren't new chalta trees growing in the Bengal Tiger Reserve?

Students figure out: The chalta trees in the Bengal Tiger Reserve make seeds. Only the seeds that get enough water and sunlight will sprout and grow into new adult plants. There are no new chalta trees because the chalta seeds must not be getting enough water and sunlight.

How they figure it out: Students read a book that models how scientists study habitats, and then students observe their own sample study sites to learn about the diversity of plants in a habitat. Students analyze maps of the tiger reserve from 1995 and 2015 and discover that no new chalta trees have grown during that time, but other plants have. They investigate seeds, read about seed needs, and record measurements of seeds planted in various conditions as they construct an understanding that seeds need sunlight and water to mature into full-grown plants. The class co-constructs a scientific explanation, concluding that the chalta seeds must not be getting the sunlight and water they need.

Chapter 2: Why aren't the chalta seeds getting the sunlight and water they need to grow?

Students figure out: The chalta trees in the tiger reserve use their roots to get water from the soil and their leaves to get sunlight. Growing chalta seeds need space far enough away from other plants so their roots can spread and their leaves can get sunlight. The chalta seeds must not be getting to places where they can get what they need to grow.

How they figure it out: Students investigate roots and leaves from different plants and obtain information from a book that enables them to explain how a plant is a system with different structures that work together to help the plant grow. Students play a board game and engage with a variety of models, including a digital app, as they discover that plants need to be in a place where they have space for their roots to absorb water and where the sun is not blocked by other plants' leaves. Students consolidate their understanding in a written scientific explanation to the lead scientist of the Bengal Tiger Reserve.

Chapter 3: Why aren't the chalta seeds getting to places where they can grow?

Students figure out: The chalta trees in the Bengal Tiger Reserve depend on elephants to disperse their seeds. Elephants eat the chalta fruit for food, move to other places in the habitat, and leave droppings with seeds inside in locations that might have water and sunlight. A fence built in 1996 has prevented elephants from coming inside the reserve, so elephants no longer disperse chalta seeds to places where they might grow.

How they figure it out: Students engage with a model in which they simulate animal dispersal of seeds, measure how many seeds were dispersed to places where the seeds are likely to grow, and analyze their results. Students obtain information about how the different parts of the Bengal Tiger Reserve habitat interact, and they create diagrams that show the interdependence of plants and animals. Students revisit the digital app to explain how seeds in particular

habitats get dispersed. Students apply their understanding of the relationship between plants, animals, and seed dispersal as they craft a scientific explanation about why the chalta seeds are not getting to places where they can grow.

Chapter 4: How are other seeds in the reserve able to get to places where they can grow?

Students figure out: Other seeds from plants in the Bengal Tiger Reserve can get to places where they can grow because the wind disperses them. Wind picks up the sal tree seeds and red silk tree seeds and carries them to different places.

How they figure it out: Students read a text that describes how peers designed and carried out an investigation about seed dispersal for seeds without fleshy fruits. Students observe images of seeds and predict how the seeds' structures might help them be dispersed to new places. Groups of students plan an investigation of seeds with specific structures. They carry out investigations of two different wind-dispersed seeds by counting and measuring the distance the seeds traveled in the wind. Students apply their takeaways from these investigations so they can explain how other seeds in the Bengal Tiger Reserve are dispersed.

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 guides the instruction designed to address specific gaps in students' understanding. This document will serve as an overview of the *Plant and Animal Relationships* 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.

In the *Plant and Animal Relationships* unit, students will learn to write scientific explanations about how an animal's role in dispersing a plant's seeds can help explain why there are no new chalta trees growing in a broadleaf forest habitat.

Prior knowledge (preconceptions): Students are likely to understand that some animals eat plants for food and that plants need water and sunlight to grow. Students may have learned that new plants grow from seeds. However, it is not expected that students have considered the interdependence of plants and animals in a habitat or how a plant's seeds can be moved to new places in a habitat. While these ideas are not necessary for students to participate fully in the unit, prior exposure to them will prepare students well for what they will be learning.

Progress Build Level 1: Plants make seeds, which can sprout and grow into new plants only if they get enough sunlight and water.

There are many different types of habitats. Each of these habitats has many different kinds of plants and animals. These plants make seeds that can sprout and grow, but only those seeds that get enough sunlight and water will sprout and grow into full-grown plants.

Progress Build Level 2: In order to grow, seeds need space to get sunlight on their leaves and to spread their roots to get water.

There are many different types of habitats. Each of these habitats has many different kinds of plants and animals. These plants make seeds that can sprout and grow, but only those seeds that get enough sunlight and water will sprout and grow into full-grown plants. **Plants have roots that spread in the soil to get water, and they have leaves to get sunlight. In order to grow into full-grown plants, seeds need space away from other plants so they can spread their roots and get sunlight on their leaves.**

Progress Build Level 3: Some plants depend on animals to disperse their seeds, and some animals depend on these plants for food.

There are many different types of habitats. Each of these habitats has many different kinds of plants and animals. These plants make seeds that can sprout and grow, but only those seeds that get enough sunlight and water will sprout and grow into full-grown plants. Plants have roots that spread in the soil to get water, and they have leaves to get sunlight. In order to grow into full-grown plants, seeds need space away from other plants so they can spread their roots and get sunlight on their leaves. **Some plants depend on animals to move their seeds to places where they can get enough sunlight and water to sprout and grow. Some animals depend on these plants for food. As these animals meet their own needs for food, they move seeds around the habitat by eating fruit, moving to other places, and leaving droppings with seeds inside.**

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	Seeds need sunlight and water to mature into full-grown plants	There are no new chalta trees because the chalta tree seeds must not be getting enough water and sunlight.
Chapter 2	Students investigate roots and leaves from different plants and discover that plants need to be in a place where they have space for their roots to absorb water and where the sun is not blocked by other plants' leaves.	The chalta seeds must not be getting to places where they can get what they need to grow.
Chapter 3	Students collect evidence and discover how seeds in particular habitats get dispersed and increase their understanding of the relationship between plants, animals, and seed dispersal.	A fence built in 1996 has prevented elephants from coming inside the reserve, so elephants no longer disperse chalta seeds to places where they might grow.
Chapter 4	Students observe images of seeds and predict how the seeds' structures might help them be dispersed to new places. They carry out investigations of two different wind-dispersed seeds by counting and measuring the distance the seeds traveled in the wind.	Other seeds from plants in the Bengal Tiger Reserve can get to places where they can grow because the wind disperses 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 2–5

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?
- What is your evidence for X?
- Can you explain what (or why X) happened?

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?
- Do you have any questions for (student who shared)?
- Is there some evidence you can share about X?

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?
- Can you explain that idea by using the vocabulary words XX and YY?
- What kind of evidence would we need to answer our question?

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 Reading of unit texts
- Discussion before/during/after reading unit texts
- Discussion of photographs and videos
- Discourse routines (e.g., Thought Swap, Think-Draw-Pair-Share)
- Science Practice Tool activities (modeling, sorting, graphing, diagramming, data)
- Simulation activities (grades 4–5)
- Evidence Card sorts
- Evidence Circles
- Roundtable Discussions

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

Day @Home Lesson 1

Minutes for science: 30 min. **Instructional format:** ❑ Asynchronous ☒ Synchronous	**Minutes for science:** 20 min **Instructional format:** ☒ Asynchronous ❑ Synchronous
Lesson or part of lesson: Introduce, student role as plant scientists and unit context (slides 1-19) , Pre Unit Assessment (slides 21-25) **Mode of instruction:** ❑ Preview ❑ Review ❑ Teach full lesson live ☒ Teach using synchronous suggestions ❑ Students work independently using: ❑ Printed @Home Slides ❑ Digital @Home Slides ❑ @Home Videos	**Lesson or part of lesson:** Students are working on the student sheets for Lesson 1 - Pre Unit Assessment (slides 21-25) **Mode of instruction:** ❑ Preview ❑ Review ❑ Teach full lesson live ❑ Teach using synchronous suggestions ☒ Students work independently using: ❑ Printed @Home Slides ❑ Digital @Home Slides ❑ @Home Videos

Students will...	**Teacher will...**	**Students will...**	**Teacher will...**
View slides and learn about the unit problem and their role as plant scientists, figuring out why new chalta trees are not growing in the Bengal Tiger Reserve. Read, draw and write (preunit assessment)	Walk through slides 1-19. Introducing the unit context, student role,, the vocabulary, the unit question, the glossary and *Handbook of Habitats*.. Assign and walk through with students each page of student sheets. (slides 21-25)	Work independently to complete the pre-unit assessment.	Assign slides 1-19 and and read aloud Handbook of Habitats as homework for student review through schoology.

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.

Synchronous: Students can put their observations about habitats in the Jamboard
Asynchronous: students will complete the pre-assessment

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

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.

Synchronous: Students can put their observations in the Jamboard

Asynchronous: Students will submit their pre unit assessment through schoology or kami

Completing Written Work	Submitting 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)	• 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

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.)

Supports:

- Break up lesson into 2 days with pre unit assessment on 2nd day, while providing more guidance
- Provide students with the Multi-Language Glossary where appropriate, add images
- Leverage primary language for discussions
- Strategic grouping
- Visual representations

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

<table>
<tr><td colspan="4">Day _____</td></tr>
<tr><td colspan="2">Minutes for science: _____

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

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