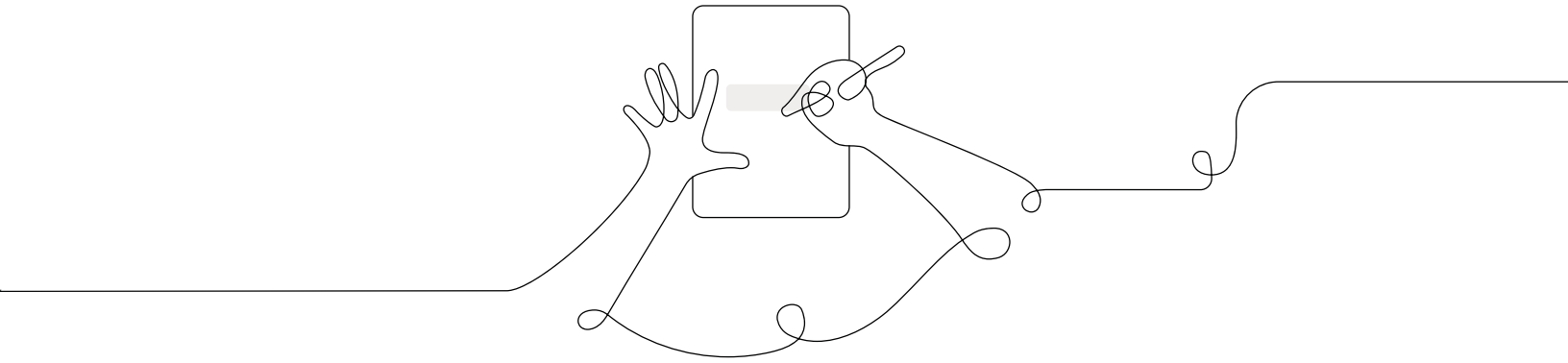
AmplifyScience

Participant Notebook

Grade K: Needs of Plants and Animals
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

How can the kids in Mariposa Grove attract monarch caterpillars to their neighborhood?

Students take on the role of scientists in order to figure out why no monarch caterpillars live in the area that was converted from a field to a community vegetable garden. They investigate how plants and animals get what they need to live and grow, and then they make a new plan for the garden that will provide for the needs of monarch caterpillars and produce vegetables for humans.

Chapter 1: Why are there no monarch caterpillars since the Field was made into the Garden?

Students figure out: Last year, the Field was a place where monarch caterpillars could live because it had milkweed for them to eat. Now that it is a Garden, there are no monarch caterpillars. The caterpillars cannot live in the Garden because the milkweed they need to eat is not there.

How they figure it out: Students learn to make multisensory observations as they go on a science walk to figure out what things live in the neighborhood. By investigating photos of animals eating and animals in their habitats, students construct the idea that animals can only live in a place that has the food they need. They observe and compare two images of Mariposa Grove and its plants—one from a year ago when it was the Field and one taken since it became the Garden. Finally, the class co-constructs an explanation for why monarch caterpillars no longer live in the Garden.

Chapter 2: Why did two milkweed seeds become plants, but the other did not?

Students figure out: Ms. Ray planted milkweed seeds in three pots, but nothing grew in one pot. The milkweed seed in that pot did not grow because it did not get water. Plants need water to grow, and they get water from the soil around them by using their roots.

How they figure it out: Students watch time-lapse videos in order to investigate what happens when plants grow. They also observe and record the growth of radish seeds and sprouting garlic plants. Students discover different ways to measure the growth of plants. They figure out that plant growth means a plant is getting bigger or adding parts that were not there before. By observing what happens to plants that do and don't have water, students can explain that plants need water.

Chapter 3: Why do the milkweed plants that get water grow differently?

Students figure out: Two of Ms. Ray's milkweed pots got water, and the seeds in those pots grew. However, the plants grew differently from each other. One plant grew more because it got the light it needed, but the other plant grew less because it did not get the light it needed. Plants need light to live and grow, and they get light with their leaves.

How they figure it out: Students investigate a picture of milkweed plants and observe that a plant in the shade did not grow well even though it had water. They plan an investigation to determine whether plants need light to live. Students then measure the growth of sunflower plants that grew in the light versus those that didn't, and they watch time-lapse videos of plants growing in the dark. Students explain why plants may not grow well even when they get water.

Chapter 4: How can humans make sure that other living things will be able to live and grow?

Students figure out: Monarch caterpillars must eat milkweed plants as they grow into monarch butterflies. Humans also need food, but they can grow the food they need. Sometimes when humans grow food, they get rid of certain plants, which might be food for other animals. This is what happened in the Garden. If humans plan a garden that has vegetables and milkweed plants, both humans and monarch caterpillars will get the food they need.

How they figure it out: Students read a book about butterfly scientists in Mexico who used what they learned through investigation to encourage people to restore the habitats of monarch caterpillars and butterflies. Students explore photos to learn ways that humans depend on plants. They design a solution to the problem by planning a garden that can meet the needs of both humans and monarchs.

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 *Needs of Plants and Animals: Milkweed and Monarchs* 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 *Needs of Plants and Animals* unit, students will learn to construct scientific explanations of why milkweed plants grow differently under different water and light conditions.

Prior knowledge (preconceptions): There is no significant prior knowledge assumed. Students may have observed plants and animals in their homes or neighborhoods, or when on outings with family members. They have experience eating and may be aware that pets and other animals need to be fed. They may have watched or helped someone care for houseplants or grow plants in a garden.

Foundational knowledge: Animals can only live in a place that has the food they need.
Before developing the ideas in the Progress Build, students develop some foundational ideas about animals and their needs:

- Living things include both plants and animals.
- Animals need food in order to live.
- Many animals eat plants for food, and they can only live in places where their food grows.

Progress Build Level 1: Growth is increasing in size or having new parts.

When a plant grows, it gets bigger or develops new parts that were not there before, such as leaves.

Progress Build Level 2: Plants need to get water with their roots.

When a plant grows, it gets bigger or develops new parts that were not there before, such as leaves. **Plants need water in order to live and grow. Plants use their roots to take in water from the soil around them.**

Progress Build Level 3: Plants also need to get light with their leaves.

When a plant grows, it gets bigger or develops new parts that were not there before, such as leaves. Plants need water in order to live and grow. Plants use their roots to take in water from the soil around them. **Plants also need light in order to live and grow. Plants get light when it hits their leaves.**

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	What kinds of plants and animals live in a place near their school. Students observe animals eating and figure out that different animals eat different foods.	Last year, the Field was a place where monarch caterpillars could live, because there was milkweed for them to eat there. Now, in the Garden, there are no monarch caterpillars. The caterpillars cannot live in the Garden because the milkweed they need to eat is not there.
Chapter 2	That even plants that live in very dry habitats have ways to get the water they need using their roots. Students observe and record the roots that garlic and radishes use to get water.	Plants need water to grow, and they get water from the soil around them using their roots.
Chapter 3	Students engage in a firsthand observation and investigation of plants and to deduce that the milkweed plants grew differently because they received different amounts of light.	Plants need light to live and grow, and they get light with their leaves.
Chapter 4	Students learn that an unintended consequence of humans cultivating wild areas for their own needs is that the habitats of other living things are changed.	When there are vegetables and milkweed plants in the Garden, humans and monarch caterpillars can have the food they need.

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 1-21 **Purpose or big idea:** Students will be scientists and figure out what changed in the Garden, and why the monarchs no longer live there.	**Lesson or part of lesson:** @Home Lesson 1 slides 22-32 **Purpose or big idea:** Students learn about setting a purpose for reading and listen to a read-aloud of Science Walk.
Students will... -Learn the problem, the role as scientists, the Chapter Question, and a new vocabulary word. -Discuss their initial ideas about what plants and animals need to live and grow. -Complete the student sheet. Students will draw and/or write about what plants and animals need to live and grow..	**Teacher will...** -introduce the unit problem, the role as scientists, the Chapter Question, and a new vocabulary word. - lead a discussion about initial ideas about how plants and animals get what they need to live and grow. -Introduce the student sheet where students will draw and/or write their ideas about how plants and animals get what they need to live and grow.
Students will... -discuss the content of what they learned in the previous lesson: • Chapter question • Vocab word-scientist -Listen to the read-aloud -learn the strategy of Setting the Purpose for Reading	**Teacher will...** -review student role and problem. -review content of what plants and animals need to live and grow. -Teach the students to Set the Purpose for Reading a book called "Science Walk". -Teacher will read aloud to the students: "Science Walk".
Additional notes:	**Additional notes:**

Some students may have little prior knowledge about the relationship between plants and animals, specifically between butterflies and milkweed plants or about the butterfly life cycle. You might choose to bring in realia, such as models of eggs, caterpillars, pupae, and butterflies, to support students' understanding of the problem they will try to solve.

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