



Needs of Plants and Animals

Unit guide



Welcome to Needs of Plants and Animals

Learning about plants and animals has always been a key area of study for young students. However, past standards didn't ask students to study the *relationship* between plants and animal until they were much older. The Next Generation Science Standards (NGSS), in contrast, expect kindergarteners to learn about the interdependent relationships in ecosystems from the very beginning—not just between plants and animals but between plants, animals, and their environment. Amplify Science California helps students make these critically important connections by presenting a real-world problem that is clear and comprehensible, and that has a solution that all kindergarteners can reach.

Unlike a typical curriculum, Amplify Science California anchors learning by inviting students to take on the role of scientists and engineers.

In this unit, students take on the role of scientists. Their job is to help the Mariposa Grove neighborhood figure out why there have been no monarch caterpillars in the community garden since vegetables were planted. Working together, they investigate how plants and animals get what they need to live and grow. By the end of the unit, students make a new plan for the community garden that provides for the needs of the monarch caterpillars in addition to producing vegetables for humans.

Unit Type: Investigation

Student Role: Scientists

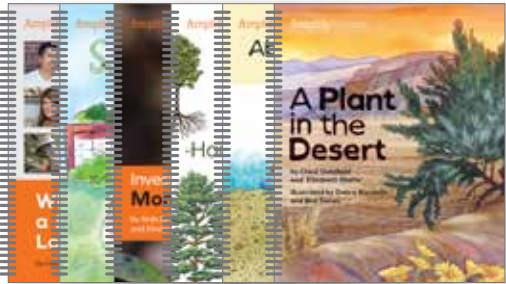
Phenomenon: Why did the monarch caterpillars begin to disappear after vegetables were planted in a Mariposa Grove community garden?

Core Concept: Understanding the relationship between the sun, other stars, and the movement of the Earth

Target Performance Expectations:

- K-LS1-1: Survival Needs
- K-ESS2-2: Impacting Environment
- K-ESS3-1: Qualities of a Habitat
- K-ESS3-3: Reducing Impacts
- K-2-ETS1-1: Defining the Problem
- K-2-ETS1-2: Developing Possible Solutions

Students figure out the unit phenomenon through the use of a variety of resources.



Big Books



Student Books



Hands-On Kit



Videos

About reading in this unit:

In grade K, students are never asked to read alone. Rather books are read *to*, *with*, and *by* students with ample scaffolding and support provided by the teacher. Big books are used to introduce ideas through read-aloud and shared reading experiences. While matching student books allow for small-group reading and reading in pairs.

About technology in this unit:

In grade K, students are never asked to access their own digital content. All media (videos, images, etc.) are experienced through whole-class projections initiated by the teacher.

Chapter 1: The storyline begins

What students investigate:


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


What they 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:


- Considering the role of a scientist and the kinds of work scientists do during a read aloud of the big book *What Does a Scientist Look Like?*
- Exploring the types of living things that might live in a neighborhood during a shared reading and partner reading of the big book *Science Walk*
- Investigating photos of animals eating and animals in their habitats
- Observing and comparing 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
- Learning about why an animal can live where it does during a shared reading of a section of the big book *Handbook of Plants*
- Co-constructing an explanation for why monarch caterpillars no longer live in the Garden


 HANDS-ON

 READING


 STUDENT-TO-STUDENT DISCUSSION


 TEACHER


 TEACHER-LED DISCUSSION


 WRITING

Day 1 | Lesson 1.1
Pre-Unit Assessment

 Reading: *What Does a Scientist Look Like?* (10 min)


 Introducing Students' Role as Scientists (15 min)


 Leading a Pre-Unit-Assessment Conversation (15 min)


 Reading: *Science Walk* (15 min)


Pre-Unit Assessment

Day 2 | Lesson 1.2
Science Walk


 Introduction to Observing (5 min)


 Partner Reading: *Science Walk* (15 min)


 Comparing Living and Nonliving Things (10 min)


 Discussing Plants and Animals (15 min)

Day 3 | Lesson 1.3
Observing a Place

 Preparing for the Walk (10 min)


 Going on a Walk (20 min)


 Debriefing the Walk (15 min)


 Reflecting on Being a Scientist (5 min)


On-the-Fly Assessment

Day 4 | Lesson 1.4
Exploring Animal Needs


 Discovering Differences in the Garden (10 min)


 Discussing Animal Needs (10 min)


 Observing Animals and Their Food (15 min)


 Reflecting on Animal Needs (10 min)

Day 5 | Lesson 1.5
Investigating Animal Habitats

 Exploring Different Habitats (10 min)


 Introducing the Reference Book (10 min)


 Observing Animal Habitats (15 min)


 Explaining Where Animals Live (10 min)


On-the-Fly Assessment

Day 6 | Lesson 1.6
Explaining Why There Are No Caterpillars

 Searching for What Caterpillars Need (15 min)


 Discovering What Caterpillars Need (10 min)


 Searching for Milkweed Plants (10 min)


 Explaining Why There Are No Caterpillars (10 min)


On-the-Fly Assessment

Day 7 | Lesson 1.7
Setting Up an Investigation

 Writing About Caterpillars and the Garden (15 min)

 Setting Up the Do Plants Need Water Investigation (15 min)

 Recording Garlic Observations (15 min)

 Reading: *What Does a Scientist Look Like?* (10 min)

Critical Juncture Assessment
Self-Assessment

Chapter 2: The storyline builds

What students investigate:


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


What they figure out:


They figure out that plant growth means a plant is getting bigger or adding parts that were not there before. 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:


- Watching time-lapse videos in order to investigate what happens when plants grow
- Observing and recording the growth of radish seeds and sprouting garlic plants
- Discovering different ways to measure the growth of plants
- Observing what happens to plants that do and don't have water
- Learning that even plants in the desert need water during a shared reading of the big book *A Plant in the Desert*
- Learning about what the different parts of a plant are called during a shared reading of a new section of the big book *Handbook of Plants*


 HANDS-ON

 READING


 STUDENT-TO-STUDENT DISCUSSION


 TEACHER


 TEACHER-LED DISCUSSION

 WRITING

Day 8 | Lesson 2.1
Growing Seeds


 Introduction to Planting Seeds (15 min)


 Observing Plant Growth (15 min)


 Reading About Plant Growth (15 min)


On-the-Fly Assessment

Day 9 | Lesson 2.2
Comparing Plant Growth

 Reviewing the Radish Seeds Video (5 min)

 Sequencing Plant Growth (15 min)


 Discussing Plant Growth (15 min)


 Comparing Milkweed Plants (10 min)


On-the-Fly Assessment
Critical Juncture Assessment

Day 10 | Lesson 2.3
Investigating Plant Needs

 Share Ideas About Plant Needs (10 min)


 Observe the Do Plants Need Water Investigation (10 min)


 Record Garlic Observations (15 min)


 Extend the Do All Plants Need Water Investigation (10 min)


On-the-Fly Assessment

Day 11 | Lesson 2.4
A Plant in the Desert

 Observing Habitats and Plants (15 min)


 Reading: *A Plant in the Desert* (15 min)


 Discussing Plant and Animal Habitats (5 min)


 Explaining What Plants Need (10 min)


On-the-Fly Assessment

Day 12 | Lesson 2.5
Observing Garlic Roots


 Thinking About How Plants Get Water (5 min)


 Observing Garlic Growth (15 min)


 Discussing the Do Plants Need Water Investigation (10 min)


 Reading About Roots (15 min)

Day 13 | Lesson 2.6
Observing Radish Roots

 Observing Radish Growth (10 min)


 Explaining that Plants Need Water (10 min)


 Reading More About Roots (10 min)


 Observing Radish Roots (15 min)

On-the-Fly Assessment

Day 14 | Lesson 2.7
Water for Milkweed

 Discuss the Milkweed Seeds (15 min)

 Explain that Milkweed Plants Need Water (15 min)

 Introduce the Mini-Book (15 min)

Critical Juncture Assessment
Self-Assessment

Chapter 3: The storyline goes deeper

What students investigate:


Why do the milkweed plants that get water grow differently?


What they 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:


- Investigating pictures of milkweed plants
- Observing that a plant in the shade did not grow well even though it had water
- Learning about why all plants need light to live and grow and also about the different types of leaves during a read aloud and partner reading of two new sections of the big book *Handbook of Plants*
- Planning an investigation to determine whether plants need light to live
- Measuring the growth of sunflower plants that grew in the light versus those that didn’t
- Watching time-lapse videos of plants growing in the dark
- Exploring how different plants and animals are meeting their needs above and below the soil during a shared reading of the big book *Above and Below*


 HANDS-ON

 READING




 STUDENT-TO-STUDENT DISCUSSION

 TEACHER

 TEACHER-LED DISCUSSION





 WRITING

Day 15 | Lesson 3.1 Planning a Light Investigation






-  Discussing Differences in Milkweed Plants (10 min)
-  Planning a New Investigation (15 min)
-  Observing Sunflower Plants (20 min)

On-the-Fly Assessment

Day 16 | Lesson 3.2 Observing Light Investigations




-  Discuss the Do All Plants Need Light Investigation (15 min)
-  Read About How Plants Need Light (10 min)
-  Add to the Plant Growth Movement Routine (5 min)
-  Explain that Plants Need Light (15 min)

Day 17 | Lesson 3.3 Growing Toward the Light

-  Observe Plants Growing Toward Light (10 min)
-  Reading More About Light (5 min)
-  Revisiting the Plant Growth Movement Routine (5 min)
-  Exploring Leaves (10 min)
-  Explaining that Milkweed Plants Need Light (15 min)

On-the-Fly Assessment
Self-Assessment

Day 18 | Lesson 3.4 Above and Below

-  Returning to the Mini-Books (15 min)
-  Previewing *Above and Below* (15 min)
-  Reading: *Above and Below* (15 min)

Critical Juncture Assessment

Chapter 4: Application to a new context

What students investigate:


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


What they 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:


- Learning about butterfly scientists in Mexico who are encouraging people to restore the habitats of monarch caterpillars and butterflies
- Exploring the transformation and migration of monarchs during a shared reading of the big book *Investigating Monarchs*
- Using photos to learn ways that humans depend on plants
- Designing a garden that can meet the needs of both humans and monarchs


 HANDS-ON

 READING


 STUDENT-TO-STUDENT DISCUSSION


 TEACHER


 TEACHER-LED DISCUSSION

 WRITING

Day 19 | Lesson 4.1
Investigating Monarchs


 Reading: *Investigating Monarchs* (15 min)


 Discussing Monarch Habitats (15 min)


 Completing the Mini-Book (15 min)

On-the-Fly Assessment

Day 20 | Lesson 4.2
Investigating Human Needs


 Reading: *Investigating Monarchs* (15 min)


 Discussing Human Needs (15 min)


 Reflecting on Human Needs (15 min)


On-the-Fly Assessment

Day 21 | Lesson 4.3
Reflecting on Needs of Living Things

 Making Choices for the Garden (15 min)


 Debriefing the New Garden (5 min)

 Explaining What Plants to Put in the Garden (10 min)

 Reflecting on Their Learning (15 min)

On-the-Fly Assessment
Self-Assessment

Day 22 | Lesson 4.4
End-of-Unit Assessment

 Talking with Students About Their Garden

End-of-Unit Assessment

All students. All standards.

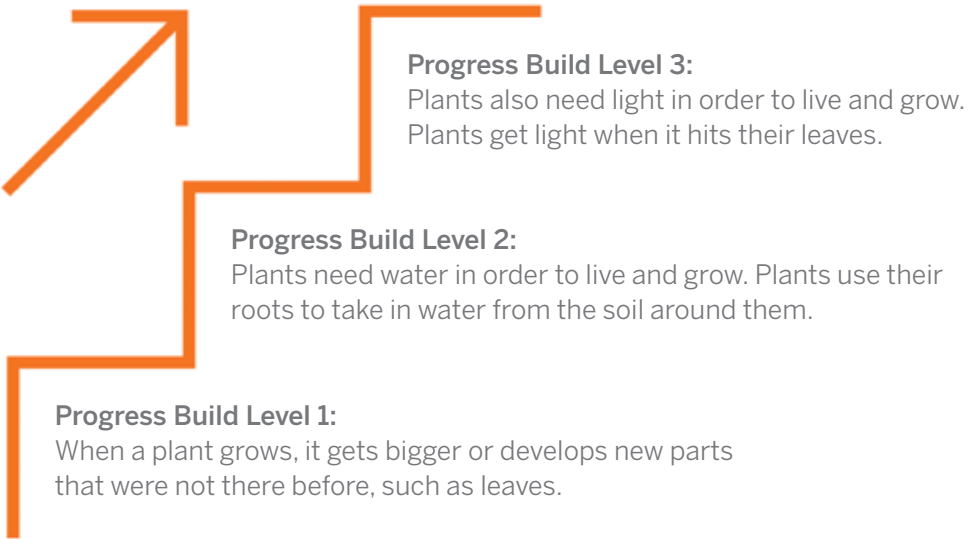
Rather than treating the standards simply as a list of topics to cover, we designed Amplify Science California to allow for truly in-depth and integrated coverage of the disciplinary core ideas (DCIs), science and engineering practices (SEPs), and crosscutting concepts (CCCs). Unlike other programs, however, we successfully made the NGSS' vision of "all students, all standards" a reality by creating a unit-specific learning progression for every unit called a Progress Build.

Each Progress Build defines several levels of understanding of the unit's anchoring phenomenon, with each level integrating and building upon the knowledge and skills from lower levels. In this way, each Progress Build provides a clear roadmap for how a students' understanding of the phenomenon is expected to deepen and develop with each successive chapter and lesson.

What's more, the program's system of assessments is also tied to these Progress Builds. This carefully crafted integration provides teachers with credible, actionable, and timely diagnostic information about student progress toward the unit's learning goals and grade-level performance expectations. Armed with this powerful data, teachers have the ultimate flexibility to decide when to move on and when to slow down and dive deeper

Needs of Plants and Animals Progress Build

The Progress Build in this unit consists of three levels of understanding. At each level, students add new ideas and integrate them into a progressively deeper understanding of why milkweed plants grow differently under different water and light conditions.



Examples of differentiation in this unit

In addition to unit-specific Progress Builds that break learning goals into smaller, more achievable levels of understanding, Amplify Science California makes learning accessible for all students through a variety of scaffolds, supports, and differentiation strategies for every lesson. **For a complete list of strategies, see the Differentiation section of every Lesson Brief.**

Below are a few examples of strategies embedded in this unit.

For English learners:

- **Additional modeling (Example from Lesson 2.5)**
In Activity 2, after observing the garlic cloves, partners will discuss what is the same and what is different about their drawings of the garlic with water and with no water. To do this, students need to use the language of similarity and difference, which may be new to some English learners. Before comparing the garlic, you can model language to use (*same* and *different*, as well as comparative words, such as *long* and *longer*) by comparing two familiar classroom items, such as two pencils. Then, use the same language to model comparing the garlic plants.

For students needing more support:

- **More time for exploration (Example from Lesson 1.2)**
You may decide to allow students to start by sorting the cards any way they would like. Encourage them to talk about the choices they made during their sort. By doing this before the card-sort activities in the lesson, students should be better able to focus on the task at hand.

For students ready for a challenge:

- **Further investigation (Example from Lesson 3.3)**
Give students other types of plants to investigate in the reference book. Students can look at photos of the barrel cactus and palo verde tree. Ask students to talk to each other about how they think these two plants get light. Accept all answers and ideas. Students may notice that both these plants have green stems but, depending on the time of year for the palo verde, no leaves. Both of these plants get the light they need to photosynthesize with their stems.

3-D Statements

In order to help teachers recognize the three-dimensional structure of every unit, chapter, and lesson, each unit contains a 3-D Statement document that makes the integration clear.

The 3-D Statement document is made all the more effective by color-coding the three dimensions for easy recognition.

KEY:

Practices

Disciplinary core ideas

Crosscutting concepts

Needs of Plants and Animals 3-D Coverage

Unit Level

Students carry out investigations to determine what plants and animals need to live and grow (systems and system models) in order to help a group of kids from the fictional town of Mariposa Grove solve the problem of why there are no longer monarch caterpillars living in a garden in their neighborhood (cause and effect). At the end of the unit, the class designs a solution to the problem by developing a model (scale, proportion, and quantity) for a garden that provides for both human and animal needs.

Chapter Level

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

Students observe and investigate the difference between living and nonliving things and the relationship between plants and animals (systems and system models) as they analyze data and gather evidence to explain why there are no monarch caterpillars in the garden (patterns).

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

Students investigate the relationship between plants and water (systems and system models) as they gather evidence to explain why the milkweed plant that was not watered looks different from those that were (cause and effect). Students obtain information to figure out that the roots are the part of the plant that help it get the water it needs (structure and function).

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

Students plan and conduct an investigation of the relationship between plants and light (systems and system models) as they measure and record growth of different plants to explain why one of the watered milkweed plants looks different from the rest of the milkweed plants (systems and system models). Students obtain information to figure out that leaves capture the light that plants need to grow (structure and function).

Chapter 4: How do we make the Garden a place where monarch caterpillars can live again?

Students obtain and evaluate information about the monarch life cycle (patterns) and the worldwide decrease of monarch populations, caused by a lack of enough milkweed plants to feed monarch caterpillars (cause and effect). Students also obtain information about how different plants are needed to meet different needs of humans (systems and system models). Students design a solution for a garden that meets the needs of both humans and monarch caterpillars.

To review the 3-D Statements at the lesson level, see the Lesson Brief section of every lesson.

3-D Statements

Needs of Plants and Animals
Teacher References

Lesson 3.4: Above and Below
Students obtain and evaluate information from the book *Above and Below* about how plants and animals meet their needs (systems and system models) and how animals can change their environment by digging holes, eating grass, turning seeds underground, etc. Students illustrate their own needs to show how milkweed plants get the light they need to live and grow (structure and function).

Lesson 4.1: Investigating M
The class gathers information about the decline of monarch populations from books to show habitats of

Lesson 4.2: Investigating H
Students investigate the water information from many things

Lesson 4.3: Reflecting on H
Students design solutions to the diagram model of the garden to become a place where both ne system models).

Lesson 4.4: End-of Unit As
Based on the information and explanations about how trees t to live and grow (patterns, sy

Needs of Plants and Animals
Teacher References

3-D Statements

Lesson 2.2: Investigating Plant Needs
Students investigate as they make and record observations of their garlic cloves that got water and those that did not. They analyze their data to determine that garlic needs water to grow (systems and system models, patterns).

Lesson 2.4: A Plant in the Desert
Students obtain and evaluate how plants live in a habitat that models).

Lesson 2.5: Observing Carl
Students continue to investigate between growing garlic cloves, their parts to get the water the

Lesson 2.6: Observing Rad
Students record and compare their data to conclude that the information from Handbook of function).

Lesson 2.7: Water for Milk
The class discusses and writes models). Students illustrate th (structure and function).

Lesson 3.1: Planning a Ligh
The class conducts a new mee though all have water (scale, pr investigation) with sunflower p

Lesson 3.2: Observing Ligh
Students review collected data without light (patterns). Stud models).

Lesson 3.3: Growing Towan
Students obtain and evaluate live and grow (structure and fu plants in the neighbor's garden

Needs of Plants and Animals
Teacher References

3-D Statements

Lesson 1.2: Science Walk
Students obtain and compare in the book *Science Walk* living things in the ecosystem that is their habitat (systems and system models) in preparation for their own science walk. They also sort cards of living and nonliving things and then progress to sorting cards of living things into categories of plants and animals to evaluate and explain (patterns and differences in living and nonliving things) (patterns).

Lesson 1.3: Observing a Pla
Students go on a science walk works together to record and a solving things (systems and

Lesson 1.4: Exploring Anim
As a class and in pairs, student discover that different animals world (systems and system m

Lesson 1.5: Investigating A
Students analyze and interpret available as food for different a habitat an animal could survive

Lesson 1.6: Explaining Why
Students gather evidence from system models). Students ide garden to conclude that there

Lesson 1.7: Setting Up an In
The class constructs a shared milkweed plants—monarch cat class is working to solve. Stud (cause and effect).

Lesson 2.1: Growing Seeds
Students set up an investigation region seeds. They obtain info out that radish seedlings grow

Lesson 2.2: Comparing Pla
Students use mathematics and leaves visible in each of a serie make the argument that plant (systems and system models)

Needs of Plants and Animals
Teacher References

3-D Statements

Key
Practices Disciplinary Core Ideas Crosscutting Concepts

Unit Level
Students carry out investigations to determine what plants and animals need to live and grow (systems and system models) in order to help a group of kids from the fictional town of Mariposa Grove solve the problem of why there are no longer monarch caterpillars living in a garden in their neighborhood (cause and effect). At the end of the unit, the class designs a solution to the problem by developing a model (scale, proportion, and quantity) for a garden that provides for both human and animal needs.

Chapter Level
Chapter 1: Why are there no monarch caterpillars since the Field was made into the Garden?
Students observe and investigate the difference between living and nonliving things and the relationship between plants and animals (systems and system models) as they analyze data and gather evidence to explain why there are no monarch caterpillars in the garden (patterns).
Chapter 2: Why did two milkweed seeds become plants, but the other did not?
Students investigate the relationship between plants and water (systems and system models) as they gather evidence to explain why the milkweed plant that was not watered looks different from those that were (cause and effect). Students obtain information to figure out that the roots are the part of the plant that help it get the water it needs (structure and function).
Chapter 3: Why do the milkweed plants that get water grow differently?
Students plan and conduct an investigation of the relationship between plants and light (systems and system models) as they measure and record growth of different plants to explain why one of the watered milkweed plants looks different from the rest of the milkweed plants (systems and system models). Students obtain information to figure out that leaves capture the light that plants need to grow (structure and function).
Chapter 4: How do we make the Garden a place where monarch caterpillars can live again?
Students obtain and evaluate information about the monarch life cycle (patterns) and the worldwide decrease of monarch populations, caused by a lack of enough milkweed plants to feed monarch caterpillars (cause and effect). Students also obtain information about how different plants are needed to meet different needs of humans (systems and system models). Students design a solution for a garden that meets the needs of both humans and monarch caterpillars.

Lesson Level
Lesson 1.1: Pre-Unit Assessment
Students read the book *Science Walk* and obtain information about what it means to observe by using all of their senses. The book also models how to make and record scientific observations of the plants and animals that live in the neighborhood (systems and system models).

1

© The Regents of the University of California

For more information on Amplify Science,
visit **amplify.com/california**.

Amplify.