Amplify Science

Grades 3–5

Pilot support

Welcome

Welcome to your Amplify Science pilot!

We're thrilled to welcome you to the Amplify family, and we look forward to making your experience with Amplify Science successful from day one.

The Next Generation Science Standards (NGSS) have raised the bar in science education. What that means for you is having to embrace a new way of teaching—one that shifts the focus of science instruction from students *learning about* to *figuring out*.

Bringing three-dimensional learning to life in the classroom can be challenging. But we're confident that—with Amplify Science by your side—you'll find your transition to the NGSS not only manageable, but also engaging and fun!

We look forward to partnering with you on this journey!

—The Amplify Science Team

Amplify.

THE LAWRENCE HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

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About the program

Amplify Science is a brand-new science curriculum that blends hands-on investigations, literacy-rich activities, and interactive digital tools to empower students to think, read, write, and argue like real scientists and engineers.

In the classroom, this looks like students:

Collecting evidence from a variety of sources

- Hands-on investigations
- Physical models
- Interactive digital simulations
- Scientific texts
- Media (including video clips, photographs, maps, and data sets)

Making sense of evidence in a variety of ways

- Highlighting and annotating texts
- Iteratively revising models
- Weighing the strength of scientific arguments
- Analyzing trends in data sets
- Manipulating variables and recording observations
- Discussing ideas and questions with classmates

Formulating convincing scientific arguments

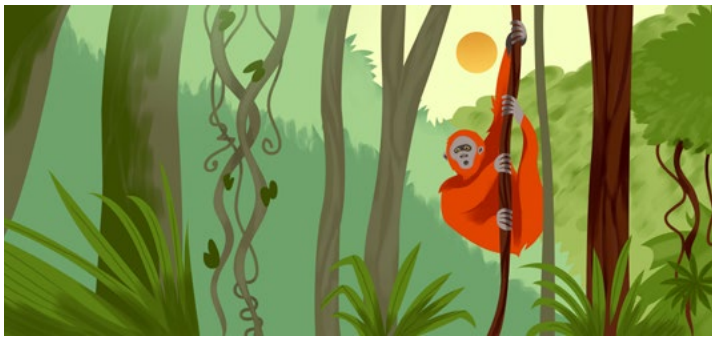
- Using evidence to support claims
- Constructing and revising models
- Writing sophisticated explanations
- Evaluating the strengths of competing claims

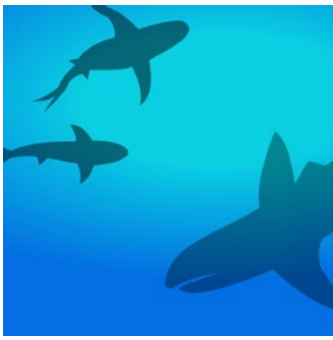
Built for new science standards and three-dimensional learning

We set out to create a science program that educators can leverage to bring three-dimensional learning to life for their students. Educators who adopt Amplify Science can rest assured knowing they have access to the newest comprehensive curriculum complete with detailed lesson plans, hands-on activities and materials, digital tools, embedded assessments, and robust teacher supports.

Amplify Science meets higher expectations for science teaching and learning.

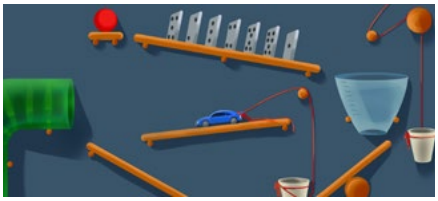
- Anchor phenomena, explored through diverse interdisciplinary contexts, serve as the foundation for compelling, coherent storylines.
- Research-based multimodal learning allows students to develop expertise in all Science and Engineering Practices (SEPs) and deep understanding of Disciplinary Core Ideas (DCIs) and Crosscutting Concepts (CCCs) through experiences within a wide variety of contexts.
- Modeling tools enable students to create, and later revise, visualizations of their ideas of key scientific phenomena at critical points in the curriculum.
- Embedded engineering in units focused on engineering and technology emphasize that there's not always one right answer, as students balance competing constraints to design the best justifiable solutions.





Course topics

Grade 3



Balancing Forces

- **Domain:** Physical science
- **Unit type:** Modeling
- **Student role:** Engineers
- **Phenomenon:** How can a train float above its tracks?

Inheritance and Traits

- **Domain:** Life science
- **Unit type:** Investigation
- **Student role:** Wildlife biologists
- **Phenomenon:** What is the origin of the traits of Wolf 44—a wolf that appears different from the rest of its pack?

Environments and Survival

- **Domain:** Life science
- **Unit type:** Engineering design
- **Student role:** Biomimicry engineers
- **Phenomenon:** Why are some grove snails more likely to survive than others?

Weather and Climate

- **Domain:** Earth and space science
- **Unit type:** Argumentation
- **Student role:** Meteorologists
- **Phenomenon:** Based on their different weather patterns, which of three islands is the best location for building a new orangutan reserve?

Grade 4

Energy Conversions

- **Domain:** Physical science
- **Unit type:** Engineering design
- **Student role:** System engineers
- **Phenomenon:** Why is the fictional town of Ergstown experiencing frequent blackouts?

Vision and Light

- **Domain:** Life science
- **Unit type:** Investigation
- **Student role:** Conservation biologists
- **Phenomenon:** What is causing the population of Tokay geckos in a rainforest in the Philippines to decline?

Earth's Features

- **Domain:** Earth and space science
- **Unit type:** Argumentation
- **Student role:** Geologists
- **Phenomenon:** How and when did a mysterious fossil form, and how did it come to be in its current location?

Waves, Energy, and Information

- **Domain:** Physical science
- **Unit type:** Modeling
- **Student role:** Marine scientists
- **Phenomenon:** How do mother dolphins communicate with their calves when they are separated at a distance under water?

Course topics

Grade 5

Patterns of Earth and Sky

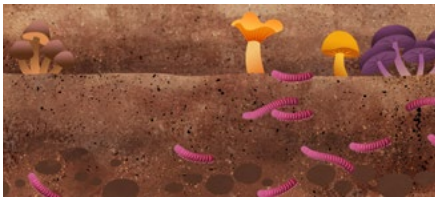
- **Domain:** Earth and space science
- **Unit type:** Investigation
- **Student role:** Astronomers
- **Phenomenon:** What important piece is missing from a recently discovered artifact that depicts what we see in the sky at different times of day?

Modeling Matter

- **Domain:** Physical science
- **Unit type:** Modeling
- **Student role:** Food scientists
- **Phenomenon:**What happens when two substances are mixed together?

The Earth System

- **Domain:** Physical science
- **Unit type:** Engineering design
- **Student role:** Water resource engineers
- **Phenomenon:** Why is East Ferris running out of water while West Ferris is not?



Ecosystem Restoration

- **Domain:** Life science
- **Unit type:** Argumentation
- **Student role:** Ecologists
- **Phenomenon:** Why are the jaguars, sloths, and cecropia trees living in a reforested section of a Costa Rican rain forest failing to grow and thrive?

Unit types

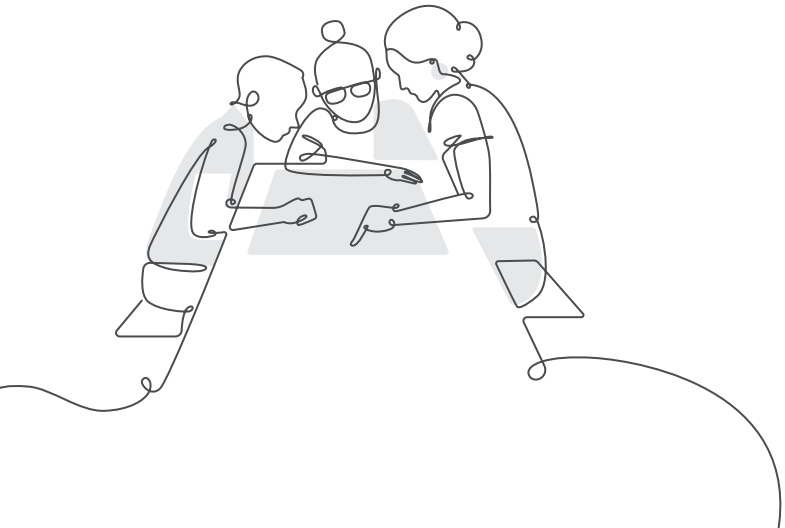
While all units are designed to provide three-dimensional learning experiences, each individual unit also emphasizes one of the following science and engineering practices.

Investigation units focus on the process of strategically developing investigations and gathering data to answer questions. Students are first asked to consider questions about what happens in the natural world and why, and are then involved in designing and conducting investigations that produce data to help answer those questions.

Engineering design units provide opportunities for students to solve complex problems by applying science principles to the design of functional solutions, and iteratively testing those solutions to determine how well they meet preset criteria.

Modeling units provide extra support to students engaging in the practice of modeling. Students use physical models, investigate with computer models, and create their own diagrams to help them visualize what might be happening on the nanoscale.

Argumentation units provide regular opportunities for students to explore and discuss available evidence, time and support to consider how evidence may be leveraged in support of claims, and gradually increasing independence as they mount their own written arguments in support of a claim.



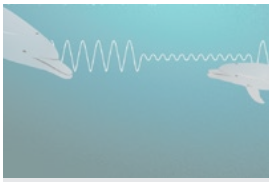
Program structure

Units

22 Lessons
Energy Conversions

22 Lessons
Vision and Light

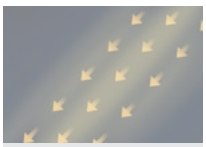
22 Lessons
Earth's Features



22 Lessons
Waves, Energy, and Information

Chapters

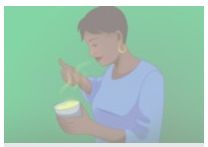
Chapter 1: How does a Tokay gecko get information about its environment?
4 lessons



Chapter 2: How does light allow a Tokay gecko to see its prey?
5 lessons

Chapter 3: How does a Tokay gecko know that it is looking at is prey?
5 lessons

Chapter 4: How could more light at night make it hard for a Tokay gecko to...
6 lessons



Chapter 5: How do our senses help us understand our environment?
2 lessons

Lessons

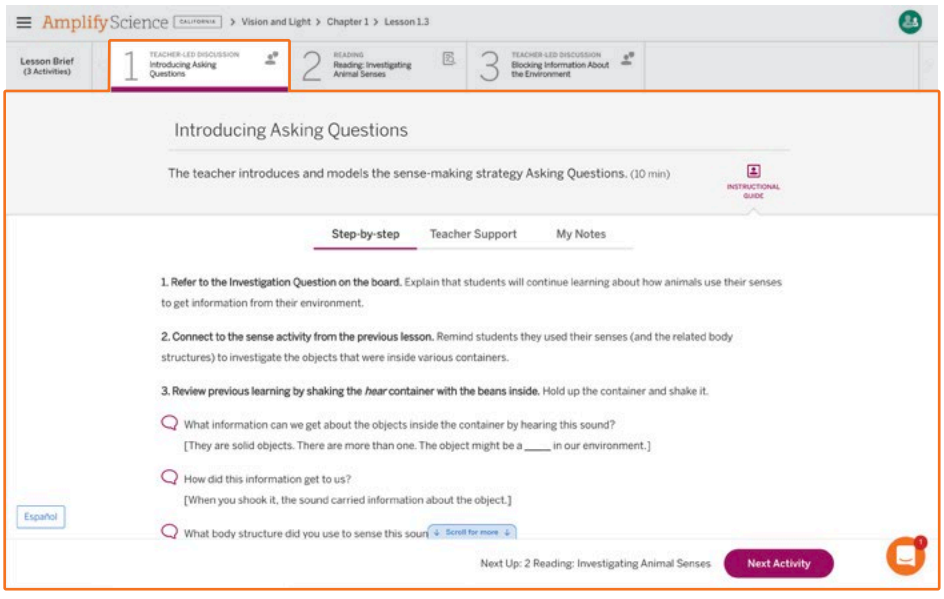
Lesson 1.1:
Pre-Unit Assessment

Lesson 1.2:
Introducing Animal Senses

Lesson 1.3:
Investigating Animal Senses

Lesson 1.4:
Exploring How Animals Survive

Activities

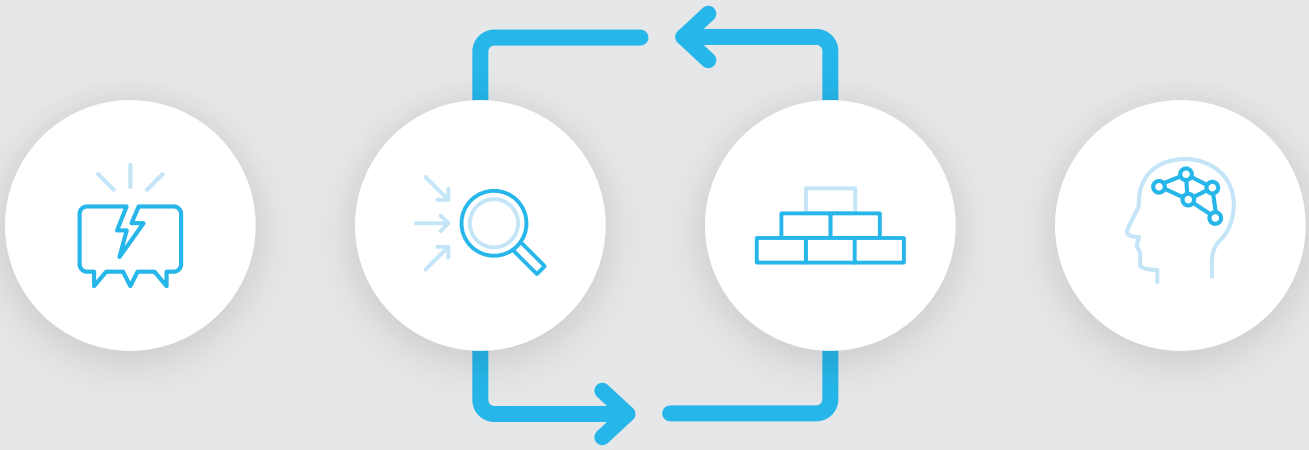


Built to develop meaningful and lasting knowledge

Rather than introducing a concept on Monday, testing for mastery on Friday, and risking students will forget everything by the next Tuesday, we help students build meaningful and lasting knowledge that they can transfer and apply over the course of the entire unit and year. We accomplish this by giving students multiple opportunities (or "at-bats") to encounter and experience a concept. Said another way, Amplify Science is made up of a series of multi-modal "mini-lessons."

It's this iterative and cyclical lesson design that allows students to learn concepts more deeply than in any other program. As they progress through the unit, their understanding gradually builds and deepens, ultimately leading to their ability to develop and refine increasingly complex explanations of the unit's phenomenon.

Lesson design in Amplify Science



Spark intrigue with a real-world problem

Explore evidence from multiple sources

Explain and **elaborate** as understanding deepens

Evaluate claims and apply to a new context or problem

Engage all unit long with cohesive and compelling storylines that build in complexity

Key components

Print Digital

Classroom Slides

Lesson-specific PowerPoints make delivering instruction a snap with embedded links to related resources and suggested teacher talk in the Notes section of each slide.

Teacher's Reference Guide

This unit-specific reference guide includes scientific background knowledge, planning information and resources, color-coded 3-D Statements, and tips for delivering instruction and differentiating learning.

Student Books

The Student Books are referenced in the instruction and serve as one of multiple sources of information for students as they gather evidence.

- 18 copies of each title included in each unit kit; digital classroom licenses available

Student practice apps, modeling tools, and digital simulations

Digital student practice apps, modeling tools, and simulations (grades 4–5) help students with modeling, graphing, and sorting information.

- Available to students through purchase of the digital Teacher's Guide

Student Investigation Notebooks

Students record their observations and thinking in Student Investigation Notebooks that are unit-specific and contain scaffolding for reading and writing activities.

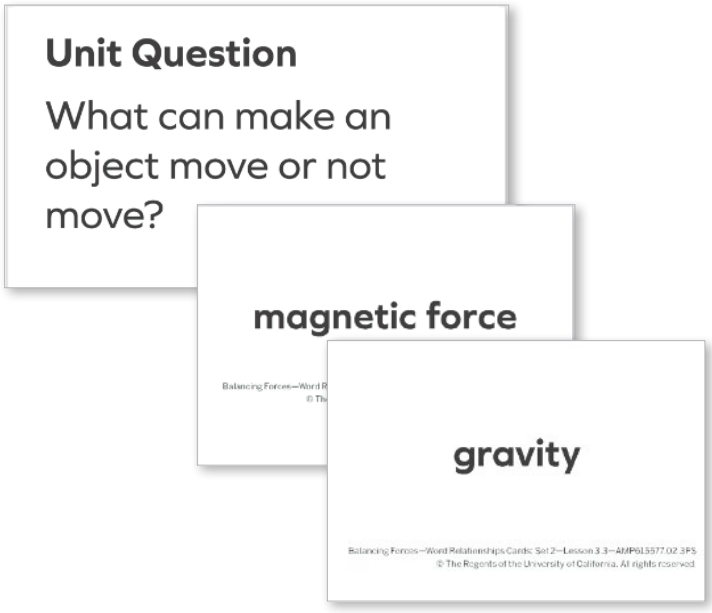
- One copy delivered in the unit kit; additional add-on copies available

Hands-on materials

Each unit-specific kit contains consumable and nonconsumable materials for use during hands-on investigations.

In the kit you will find:

- Hands-on materials
- 18 copies of each of the Student Books
- Classroom display materials
- One Student Investigation Notebook



Meet your new hands-free TG!

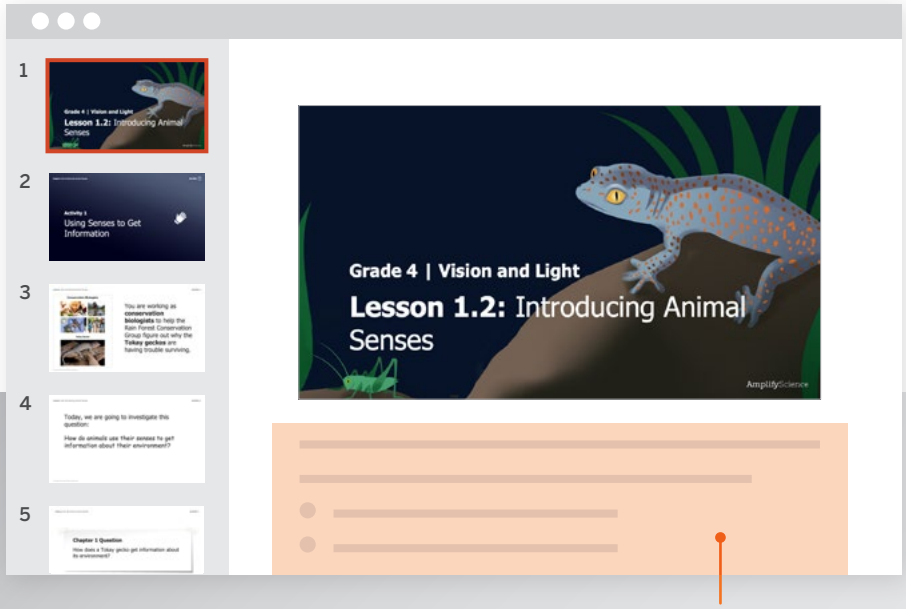
Science time just got a whole lot easier with Classroom Slides! Think of these slides as your hands-free TG. Classroom Slides let you put down the Teacher's Guide and focus on what matters most—your students. Plus, with Classroom Slides, lesson prep is as quick as a click!

Classroom Slides are:

- **Available offline**, which means no more sweating unreliable internet connections.
- **Streamlined for easy lesson delivery**, including lesson visuals, activity instructions and transitions, animations, investigation setup videos, technology support, and more.
- **Fully editable**, allowing you to incorporate your own flavor, flair, and favorite resources.

GO ONLINE

To find Classrooms Slides, log into learning.amplify.com and look in the Digital Resources section of any lesson.



The Notes section of most slides includes suggested teacher talk, teacher actions, potential student responses, and assessment supports. The first slide of each file includes links to relevant resources in the digital Teacher's Guide.

What did **Dr. Marzluff**, the crow scientist, **wonder** about?

What **question** did he ask in his investigation?

Sense Investigation Materials

Step 1
Visit the Sense Station your group is assigned to.

Step 2
Look carefully at the materials you can use for your investigation, but don't touch them yet.

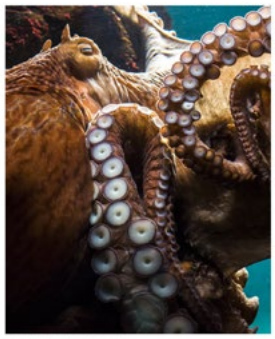
Step 3
Discuss with your group which **materials** you might use for your investigation.

Build Your Vision Model

Step 1
Work with your partner to **build your mode** eye with high-sensitivity receptors or an eye sensitivity receptors.

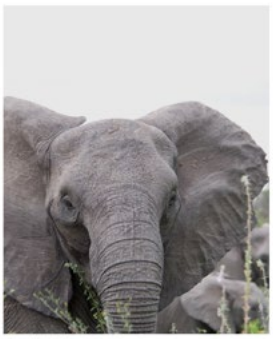
Step 2
Check that you can use your model to demo how each **structure** in the eye **functions**.

Step 3
Check that you can use your model to show structures **work together as a system** to animal to **see in different amounts of lig**



An **octopus** has more **touch sensitivity** than a person.

Each of the octopus's eight arms has hundreds of suckers that get information by touch.



An **elephant** can **hear lower sounds** than a person.

The low sounds elephants make can be heard by another elephant six miles away!

How can we use the materials in the model to show how the animal sees in **bright light** and in **low light**?

We know light carries information about the environment.

How could **more light** at night make it hard for a Tokay gecko to **see its prey**?

What did **Dr. Marzluff**, the crow scientist, **wonder** about?

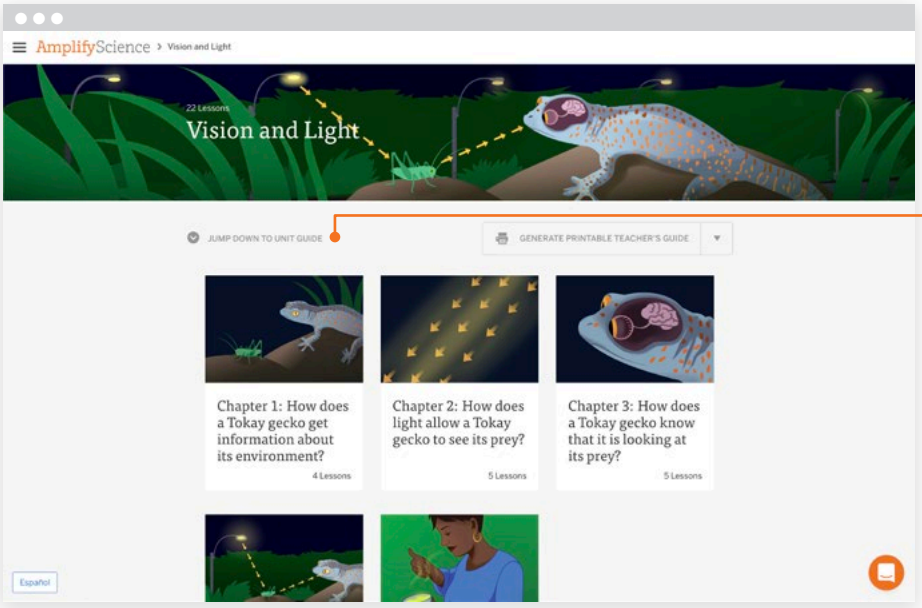
What **question** did he ask in his investigation?

Navigating a unit

In each Unit Guide section (both in the Teacher's Reference Guide and digital Teacher's Guide) there is a **Planning for the Unit** section that outlines critical information, such as:

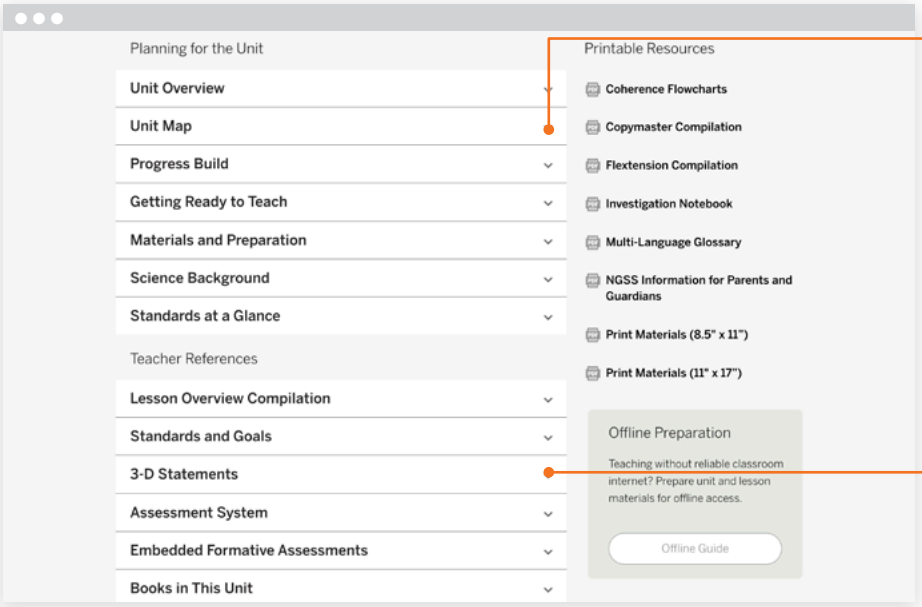
- **Unit Overview** – A detailed explanation of the why behind the unit's content and specific activities
- **Unit Map** – A summary of each chapter including what students figure out and how they do it
- **Progress Build** – The unit's core concept broken down into different levels of understanding to ensure that every child is appropriately challenged
- **Coherence Flowcharts** – A visual tool that represents the storyline of the unit and the coherent flow of questions, evidence, and ideas that support students as they build complex explanations of the unit's anchor phenomenon
- **Materials and Preparation** – A snapshot of the materials you need and how to prep them for instruction
- **Science Background** – Critical information about the science being addressed in the unit

1



Click on **JUMP DOWN TO UNIT GUIDE**.

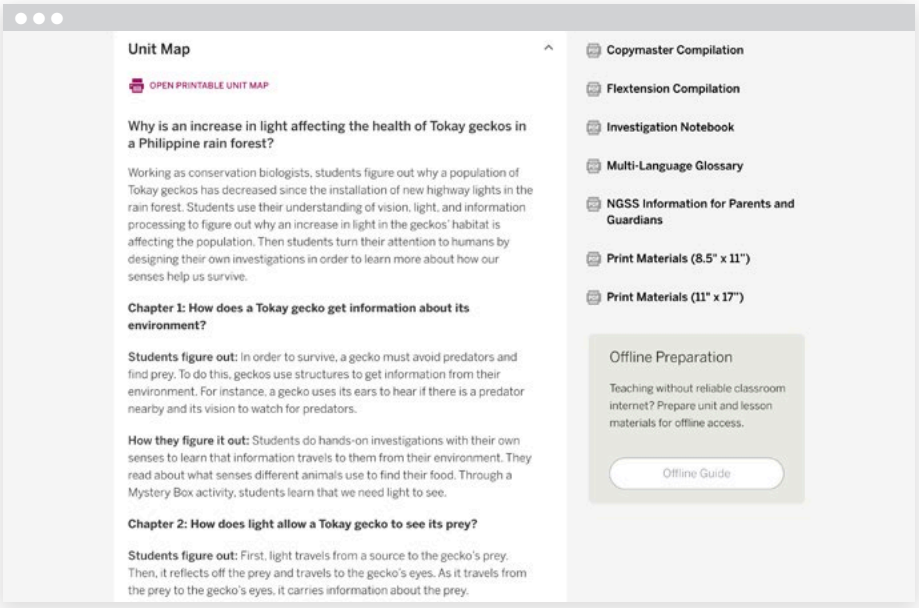
2



To access the **Unit Map**, click on the drop-down arrow.

Review the **3-D Statements** for the unit.

3



Unit Map from the *Vision and Light* digital Teacher's Guide

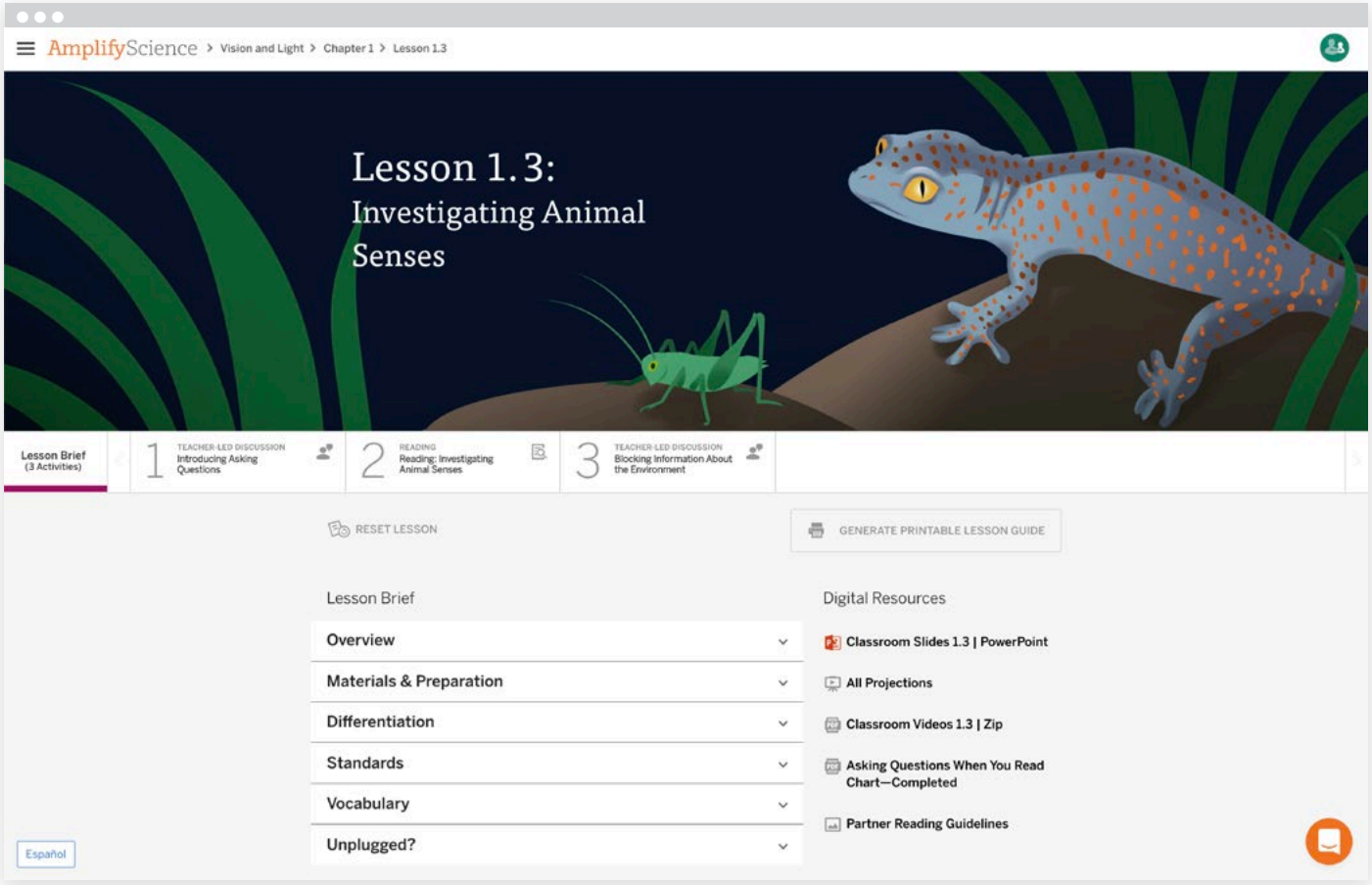
Navigating a lesson

Within each lesson (both in the Teacher's Reference Guide and digital Teacher's Guide) there is a **Lesson Brief** section that outlines critical information, such as:

- Lesson Overview
- Materials and Preparation
- Differentiation
- Standards
- Vocabulary

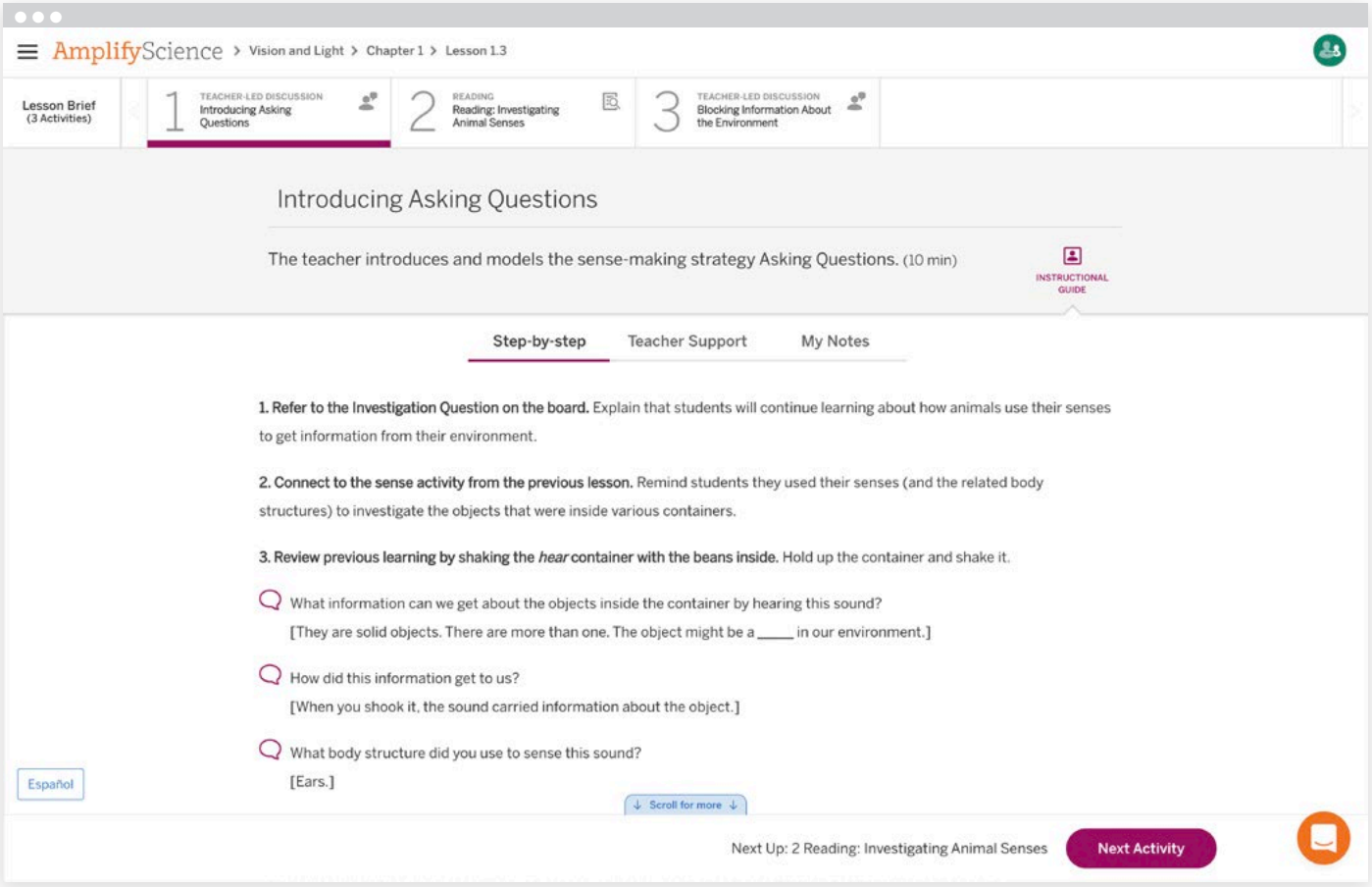
In the digital Teacher's Guide, you'll also find a **Digital Resources** section that contains key resources, such as:

- Classroom Slides
- Projections
- Video links
- Other lesson-specific resources



Every lesson in Amplify Science is made up of a series of activities. When you navigate to a lesson in the digital Teacher's Guide, you'll see those activities arranged from left to right near the top of your screen. Once you click into an activity, you'll see the **Instructional Guide**, which includes:

- ✔ **Step-by-step instructions for teaching the lesson**
- ✔ **Recommended teacher talk**
- ✔ **Additional tabs for Teacher Support, Notes, and Possible Student Responses**

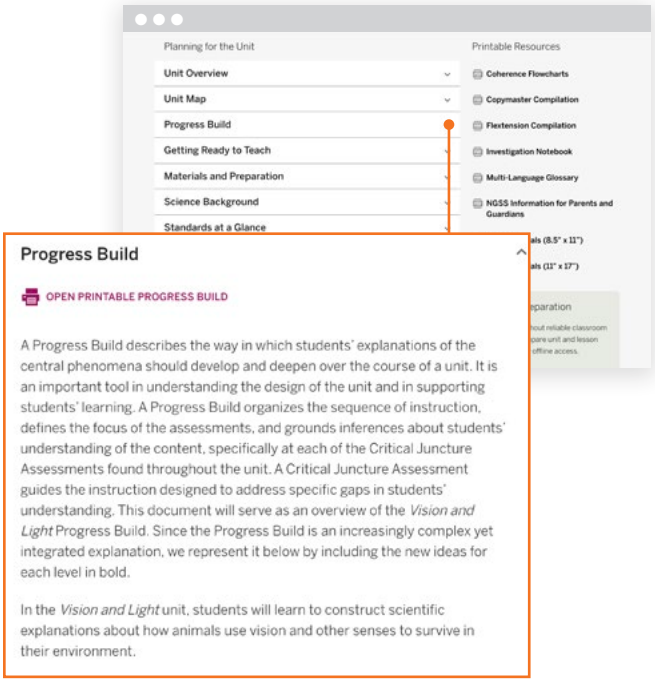


Instructional supports

Progress Builds

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 student's 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 tied to these Progress Builds. This carefully crafted integration provides teachers with credible, actionable, and timely diagnostic information about student progress. Armed with this powerful data, teachers have the ultimate flexibility to decide when to move on and when to slow down and dive deeper.



Vision and Light Progress Build

The Progress Build in this unit consists of four levels of understanding. At each level, students add new ideas and integrate them into a progressively deeper understanding of how animals use vision and other senses to survive in their environment.

Progress Build Level 1:
Animals use senses to learn about their environment.

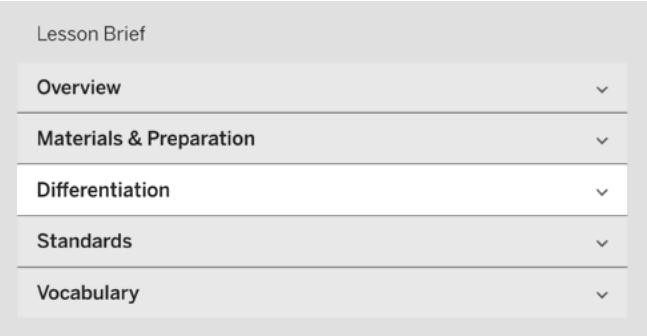
Progress Build Level 2:
Light allows objects in an environment to become visible to the eye.

Progress Build Level 3:
Light receptors in the eye respond to light and the brain forms an image.

Progress Build Level 4:
Different animals have light receptors with different sensitivities to light.

Differentiation

In addition to unit-specific Progress Builds that break learning goals into smaller, more achievable levels of understanding, Amplify Science 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.



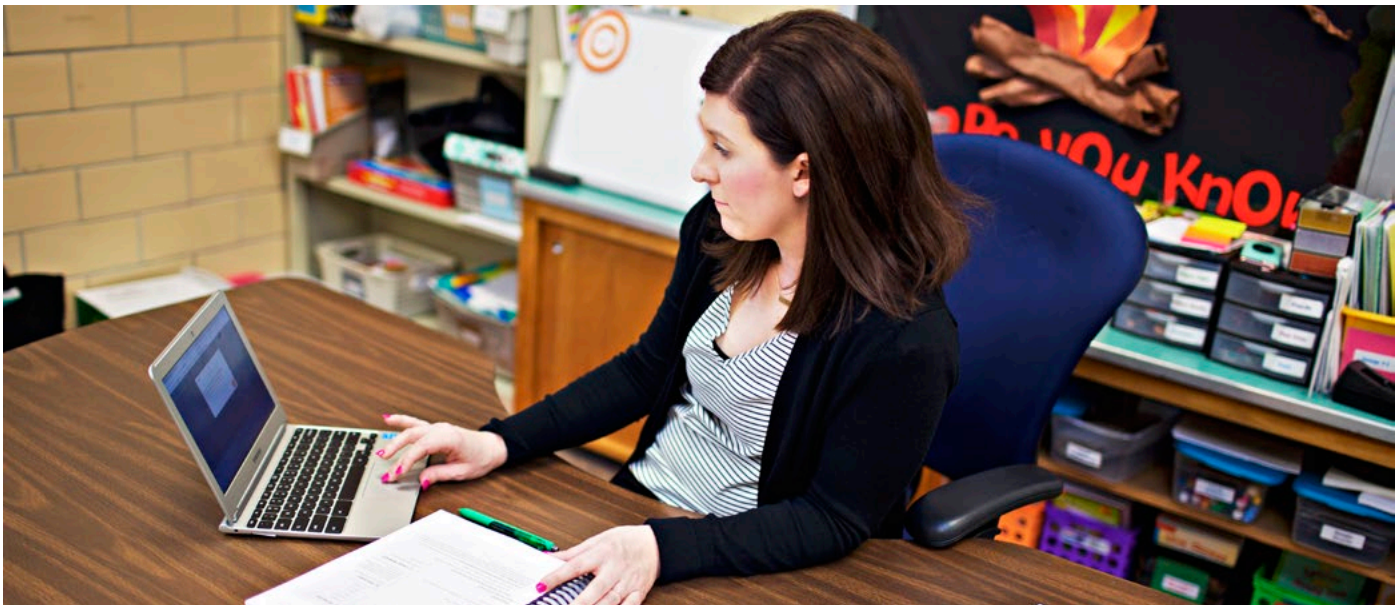
Assessments

In Amplify Science, assessments are directly tied to instruction and support students in advancing through the various levels of the Progress Build.

The assessments included with Amplify Science are:

- **Pre-Unit Assessments:** Conducted during the first lesson of each unit, these assessments include discussion, modeling, and written explanations to gauge students' prior knowledge and inform the instructional pace for the unit.
- **On-the-Fly Assessments (OtFAs):** These multidimensional assessments are integrated regularly throughout the lessons wherever you see this icon . OtFA opportunities provide evidence of how a student is coming to understand core concepts and developing an understanding of SEPs and CCCs.
- **Self-assessments:** Once per chapter, students have an opportunity to reflect on their own learning, ask questions, and reveal ongoing wonderings about unit content.
- **Critical Juncture Assessments:** Each chapter includes an integrated multidimensional performance task that can be use to assess student progress. Examples include writing scientific explanations, engaging in argumentation, developing and using models, and designing engineering solutions.
- **End-of-Unit Assessment:** Assessments toward the end of each unit feature a combination of targeted discussions, student-generated models, and written explanations to gauge students' knowledge and growth.
- **NGSS Benchmark Assessments:** Developed by Amplify, the Next Generation Science Standards (NGSS) Benchmark Assessments give you insight into how your students are progressing toward mastery of the three dimensions and performance expectations of the NGSS ahead of high-stakes end-of-year assessments. They are given three to four times per year, depending on the grade level, and are delivered after specific units in the recommended Amplify Science scope and sequence.

Teaching tips



Tips for preventing tech headaches:

- Download all unit and lesson resources using the Offline Guide in the event that unexpected connectivity issues strike.
- Use Chrome or Safari if possible as these are our preferred browsers.
- Disable pop-up blockers on all devices being used to support lessons.
- Be prepared for some webpages to open in a new tab and for PDF files to download automatically.
- Check and test your connections to any projection devices that you might be using throughout the lesson.
- Display the student URL (**apps.learning.amplify.com/elementary**) near the classroom display materials.
- Bookmark frequently used URLs for easy access.

URLS TO BOOKMARK

- **learning.amplify.com** gives you access to the digital Teacher's Guide.
- **apps.learning.amplify.com/elementary** gives your students access to any practice apps referenced in the instruction. The teacher will either need to log in using their credentials, or have student accounts set up.
- **amplify.com/nat-pilot** gives you access to other pilot support resources including videos, teacher tips, and downloadable unit guides.

Tips for delivering lessons with ease

Know the unit's big idea

Before you begin a unit, become familiar with its big idea, instructional goals, and phenomenon by reading the following sections in the **Unit Guide**:

- Unit Map
- 3-D Statements
- Books in this Unit
- Science Background (if needed)

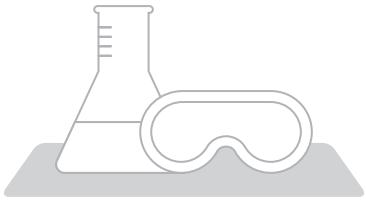
Reading the Student Books associated with each unit is also a great way to get comfortable with the key concepts that students will encounter over the course of the unit.

Understand how the lesson will flow

Before each lesson, become familiar with the goal of the lesson, its key activities, and your options for addressing various student needs. Start by downloading your **Classroom Slides**, and then read the following sections in the **Lesson Brief**:

- Lesson Overview
- Differentiation
- Vocabulary

Gather your materials



We make finding and managing your materials easy by explaining everything you'll need for each lesson in the **Materials and Preparation** section of the Lesson Brief. This section even organizes your preparation steps as follows:

- Before the Day of the Lesson
- Immediately Before the Lesson
- At the End of the Day

Prepare your digital device plan in advance

What's important to know is that Amplify Science lessons never require that every student has a separate device. When the use of practice apps is called for in a lesson, you have several options:

- **If limited student devices are available**—Have students do the activities in pairs or small groups.
- **If no student devices are available**—Project the digital tool to the class and either "drive" the digital tool yourself or invite students to "drive" by using your device.
- **If internet access is unavailable**—Preload the digital tool on your device or devices for use offline.

Implementation support

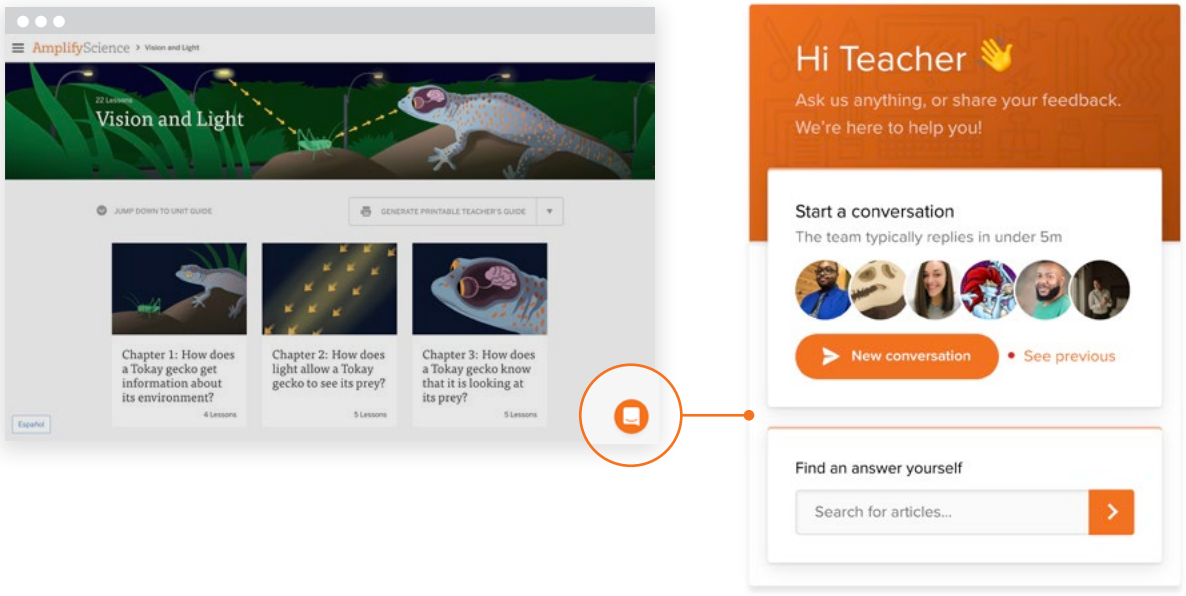
Your role as a pilot teacher is important. Your district is counting on you not only to evaluate how a curriculum works, but also to pick a reliable and supportive long-term partner.

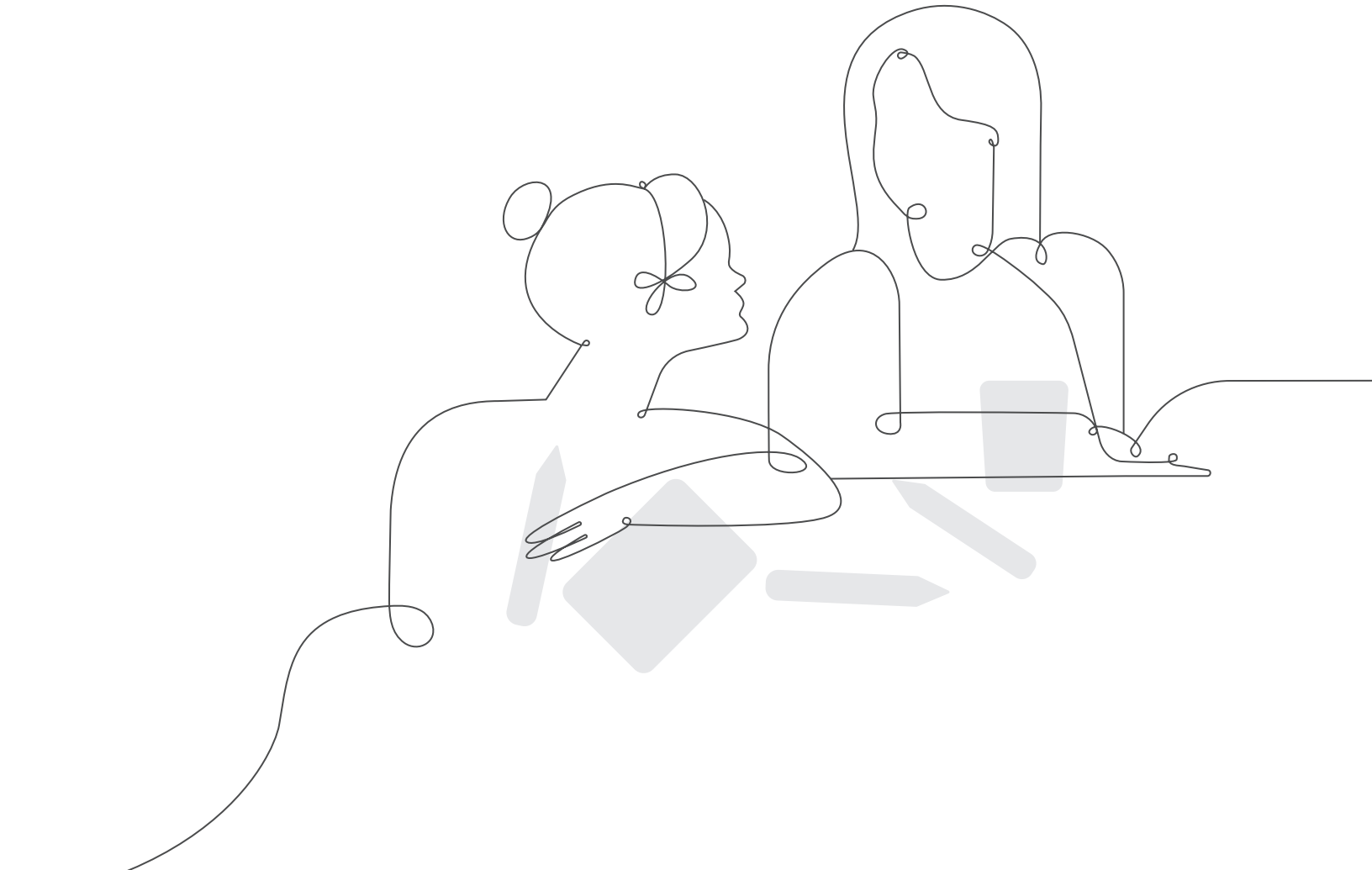
We feel confident that we're that partner, and we look forward to proving that to you during your pilot experience.

Support is available through any of the following channels:

- Chat in real time using the intercom feature in the digital platform.
- Visit **my.amplify.com/help** anytime to browse our library of support posts and on-demand videos.
- Call (800) 823-1969.
- Email **help@amplify.com**.
- Reach out to your pilot coordinator: _____
- Reach out to your Amplify representative: _____

With our intercom, support is just one click away.





Notes

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For more information on Amplify Science, visit **amplify.com/nat-pilot**.

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