

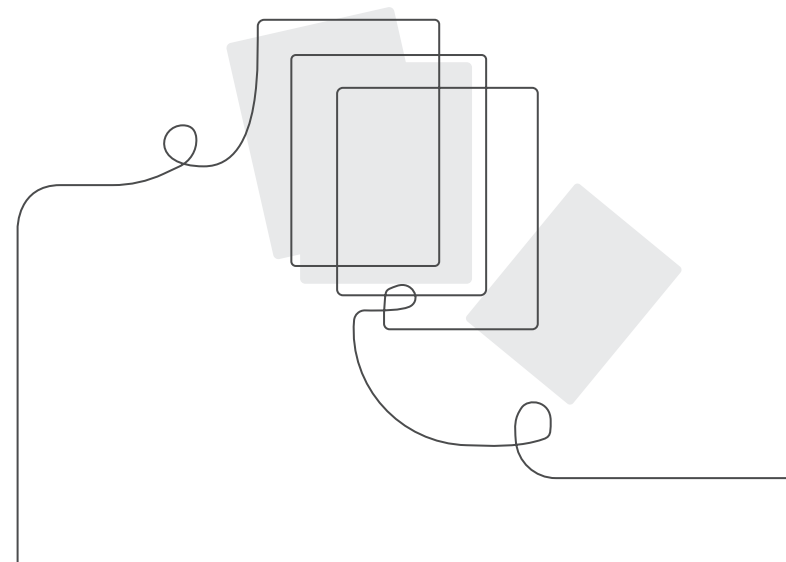
EQuIP Rubric for Lessons & Units: Science

VERSION 3.0

authored by



THE LAWRENCE
HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY



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Table of contents

Category I: NGSS 3D Design (lessons and units).....	4
Category I: NGSS 3D Design (additional criteria for units only)	9
Category II: NGSS Instructional Supports (lessons and units).....	15
Category II: NGSS Instructional Supports (additional criteria for units only).....	22
Category III: Monitoring NGSS Student Progress (lessons and units).....	24
Category III: Monitoring NGSS Student Progress (additional criteria for units only).....	29

Category I: NGSS 3D Design (lessons and units):

The lesson/unit is designed so students make sense of phenomena and/or design solutions to problems by engaging in student performances that integrate the three dimensions of the NGSS.

Lesson and unit criteria

Lessons and units designed for the NGSS include clear and compelling evidence of the following:

Where to find evidence in Amplify Science

(Note: When appropriate, a brief explanation of the location of information/documents in the Amplify Science online Teacher's Guide is provided.)

A Explaining phenomena/ designing solutions

Making sense of phenomena and/or designing solutions to a problem drive student learning.

- i Student questions and prior experiences related to the phenomenon or problem motivate sense making and/or problem solving.
- ii The focus of the lesson is to support students in making sense of phenomena and/or designing solutions to problems.
- iii When engineering is a learning focus, it is integrated within the development of disciplinary core ideas from physical, life, and/or earth and space sciences.

Explanation

In each Amplify Science unit, students are asked to inhabit the role of a scientist or engineer in order to figure out scientific phenomena through a 21st-century, real-world problem context. Over the course of the unit, students collect and make sense of evidence from multiple sources and through a variety of modalities, ensuring that they have multiple vehicles through which to develop and articulate their understanding of each phenomenon. As the class progresses through their lessons, students move back and forth from firsthand investigation and inquiry to secondhand analysis and synthesis, formulating an increasingly complex explanation to help them solve the problem at hand. Finally, at the end of the unit, students are presented with a brand-new problem context to consider, giving them an opportunity to take what they've learned over the course of the unit thus far and apply it to this new context, thereby demonstrating a deep understanding of the phenomenon.

Evidence

- **Needs of Plants and Animals** unit (kindergarten): Students assume the role of scientists helping a group of children to explain why there are no more monarch caterpillars in a community garden that was converted from a field which once had caterpillars. At the end of the unit, students recommend a plan to redesign the garden in such a way that it accommodates the needs of both humans and monarch caterpillars.
- **Waves, Energy, and Information** unit (grade 4): Students take on the role of marine scientists investigating how bottlenose dolphin mothers and their calves use patterns of sound to communicate across distances. To learn about important characteristics of sound and how sound travels through materials, students engage with several models of sound waves, as well as informational text and firsthand investigations with sound, to learn how sound waves travel at the particle level and how a sound's volume and pitch correspond to the amplitude and wavelength of the sound wave. In the last chapter of the unit, students broaden their understanding of patterns in communication by investigating the patterns that humans use to communicate across distances.
- **Spinning Earth** unit (grade 1): Students assume the role of sky scientists, helping a young boy named Sai who lives in a place near them understand why the sky looks different to him than to his grandma when they talk on the phone. Students record, organize, and analyze observations of the sun and other sky objects as they look for patterns and make sense of the cycle of daytime and nighttime. Finally, students investigate why the lengths of daytime and nighttime change throughout the year, drawing conclusions about seasonal differences of daytime and nighttime.

In addition to figuring out and explaining phenomena, each year of Amplify Science K–5 has a unit that is focused on engineering design in which students apply science principles in order to design functional solutions and iteratively test those solutions to determine how well they meet specific criteria. Students develop their understanding of science ideas from investigation and text, and apply them in designing a solution to an engineering problem. They then evaluate their solutions to see how well they meet a set of criteria for quality.

Evidence

- **Properties of Materials** unit (grade 2): Students take on the role of glue engineers and use engineering design practices to create a glue for use at their school. They conduct hands-on investigations to observe properties of a variety of possible glue ingredients and learn how certain materials respond to heating and cooling, engage in digital card sorts to apply their understanding of how properties of ingredients affect properties of mixtures, and search for useful information about each ingredient in the unit's reference book. Over the course of the unit, students conduct tests that yield quantifiable results; graph their data; analyze and interpret results; and then use that evidence to iteratively design a series of glue mixtures, each one better than the one before. By the end of the unit, students are able to speak knowledgeably about their choices and argue for how a particular glue mixture best meets their design goals, with evidence from a variety of sources.
- **Environments and Survival** unit (grade 3): Students assume the role of biomimicry engineers studying a population of grove snails to understand how the snails' traits influence their survival in a changing environment. At the end of the unit, students use their newfound understanding of how the traits of organisms affect their survival in order to help the engineering firm design a robot that aims to mitigate the effect of an environmental change.
- **The Earth System** unit (grade 5): The cities of East Ferris and West Ferris are located on different sides of a mountain on the fictional Ferris Island. East Ferris is having a water shortage while West Ferris is not. As water resource engineers, students learn about the Earth system to help figure out what is causing the water shortage problem and design possible solutions, including freshwater collection systems and proposals for using chemical reactions to treat wastewater.

Finding additional evidence

Unit level, refer to:

- 1 **Unit Map.** Open any unit. Click "JUMP DOWN TO UNIT GUIDE" link, then click "Unit Map".
- 2 **Unit Overview.** Open any unit. Click "JUMP DOWN TO UNIT GUIDE" link, then click "Unit Overview." Notice the What? How? Why? paragraphs.
- 3 **Embedded Formative Assessments.** Open any unit. Click "JUMP DOWN TO UNIT GUIDE" link, then click "Embedded Formative Assessments." Note the focus on making sense of and supporting students for the list of Lessons/Activities within a lesson, and the specific phenomena.

Lesson level, refer to:

- 1 **Early in the unit (usually lesson 1.2, after the Pre-Unit Assessment),** students are introduced to the scientific roles they will inhabit and the phenomena that they will figure out. Refer to the Instructional Guide in each lesson for detailed teacher-facing instructions.
- 2 Explore the **Activities** in any lesson, and the associated Instructional Guides. See the multiple modes of investigation/ firsthand inquiry, collaboration/student-to-student discourse, modeling, reading, and visualizations.

B Three dimensions

Builds understanding of multiple grade-appropriate elements of the science and engineering practices (SEPs), disciplinary core ideas (DCIs), and crosscutting concepts (CCCs) that are deliberately selected to aid students in making sense of phenomena and/or designing solutions.

Explanation

Amplify Science's real-world problems provide relevant, 21st-century contexts through which students will investigate different scientific phenomena and develop a deeper understanding of disciplinary core ideas (DCIs), acquire more experience with science and engineering practices (SEPs), and observe the interconnectedness of various science disciplines through the cross-cutting concepts (CCCs).

Amplify Science 3-D Statements

- Science and engineering practices
- Disciplinary core ideas
- Crosscutting concepts

The Amplify Science curriculum developers at University of California, Berkeley's Lawrence Hall of Science crafted each unit, chapter, and lesson with the following questions in mind: What do we want students to figure out (what DCI or part of a DCI)? How do we want them to figure it out (what SEP will they engage in to figure it out)? What CCC can scaffold students' understanding and connect it to other ideas about the natural world that they have learned? This resulted in a curriculum that incorporates a strategic, well-balanced integration of the three dimensions. 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. This color-coded information is also made available to teachers at the individual lesson level, within the "Standards" section of the Lesson Brief.

Evidence

3-D statements from the **Light and Sound** unit (grade 1) include:

- **Unit level:** Students **investigate and construct explanations** about **how light and sound can be used to create solutions** for a puppet-theater company (**cause and effect**). Students apply what they learn in order to **design solutions** to create shadow scenery and sound effects for a puppet-theater show (**patterns**).
- **Chapter level:** Chapter 2, "How do we make a dark area in a bright puppet show scene?": Students **investigate and construct explanations** about **the effect that some materials can have on blocking light from a surface** (**cause and effect; patterns**).
- **Lesson level:** Lesson 3.4, "Planning and making our stencils": Students **make diagrams** of their proposed solutions for stencils that will project **a puppet show scene that enables all, some, or no light to pass through** (**cause and effect**).

3-D statements from the **Balancing Forces** unit (grade 3) include:

- **Unit level:** Students are challenged to explain how a floating train works in order to reassure nervous citizens. To solve the mystery, students **plan and conduct investigations; analyze patterns in data** (**patterns**); and **obtain information** about **magnetic force, gravity, and balanced and unbalanced forces**. Students **write explanations and create physical models and diagram models** to show **why the train's vertical motion is stable at times and changes at times** (**stability and change**).
- **Chapter level:** Chapter 4, "Why does the train float, even though gravity is acting on it?": Students **gather evidence to support the claim** that **two forces can act on an object at once**. They discover how **balanced forces can make an object's motion stable** (**stability and change**) by **planning and conducting investigations and obtaining information by reading**.
- **Lesson level:** Lesson 3.4, "Modeling and Explaining the Falling Train": Students **use mathematical thinking as they create diagram models** of **forces that change the motion of several objects**. They **create physical models and write explanations** about **what causes the train to fall** (**cause and effect**).

3-D statements from the **Waves, Energy, and Information** unit (grade 4) include:

- **Unit level:** **Using physical and computer models to observe and analyze patterns** (**patterns**), students figure out how **sound travels as a wave** (**energy and matter**). They apply that knowledge to **explain how dolphins in the fictional Blue Bay send and receive signals underwater when separated** (**energy and matter**) and **how humans encode, send, and receive patterns of information for efficient communication across distances** (**patterns; scale, proportion and quantity**).
- **Chapter level:** Chapter 1, "How does a mother dolphin communicate with her calf across a distance?": Students **use models to investigate waves and how sound travels** (**patterns; energy and matter**). They figure out that **sound energy travels as a wave from a source to a listener** (**patterns; energy and matter**). Students **create initial Sound Diagrams**, and the class constructs an initial scientific explanation about **how a mother dolphin uses sound to communicate underwater with her calf across a distance** (**energy and matter; scale, proportion and quantity**).
- **Lesson level:** Lesson 4.3, "Communicating with Codes": Students use the Code Communicator Tool to encode an image in **binary code** (**patterns**) and **design a plan to communicate the image across a distance** (**patterns; energy and matter**).

Finding additional evidence

Unit level, refer to:

- 1 3-D Statements. Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “3-D Statements.”

Lesson level, refer to:

- 1 Standards (Lesson Brief). Open any lesson in any chapter of any unit. Scroll down to “Standards” line and click the black carrot to expand the section. See the 3-D Statement at the top.

-
- i Provides opportunities to develop and use specific elements of the SEP(s).

Unit level, refer to:

- 1 Standards and Goals. Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Standards and Goals.”
- 2 3-D Statements. Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “3-D Statements.”

Lesson level, refer to:

- 1 Standards (Lesson Brief). Open any lesson in any chapter of any unit. Scroll down to “Standards” line and click the black carrot to expand the section.

-
- ii Provides opportunities to develop and use specific elements of the DCI(s).

Unit level, refer to:

- 1 Standards and Goals. Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Standards and Goals.”
- 2 3-D Statements. Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “3-D Statements.”

Lesson level, refer to:

- 1 Standards (Lesson Brief). Open any lesson in any chapter of any unit. Scroll down to “Standards” line and click the black carrot to expand the section.

-
- ii Provides opportunities to develop and use specific elements of the CCC(s).

Evidence needs to be at the element level of the dimensions. (See rubric introduction for a description of what is meant by “element.”)

Unit level, refer to:

- 1 Standards and Goals. Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Standards and Goals.”
- 2 3-D Statements. Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “3-D Statements.”

Lesson level, refer to:

- 1 Standards (Lesson Brief). Open any lesson in any chapter of any unit. Scroll down to “Standards” line and click the black carrot to expand the section.

C Integrating the three dimensions

Students making sense of phenomena and/or designing solutions requires student performances that integrate elements of the SEPs, CCCs, and DCIs.

Explanation

Amplify Science is rooted in the research-based Do, Talk, Read, Write, Visualize, which has students engaging with SEPs, figuring out DCIs, and noticing and reflecting upon CCCs in thoughtful, structured activities in each lesson.

- **DO:** “Do” means collecting firsthand evidence. This can include conducting hands-on investigations, making observations of a video clip, or collecting data using a digital simulation, all of which can then be used as evidence in formulating a convincing scientific argument.

- **TALK:** Student-to-student discourse is a key indicator of a productive learning environment, and talking is a key modality for instruction in an Amplify Science class. This is more than just partner activities or group work (though there's plenty of that, too). For example, reading activities are followed by a student-to-student discussion where students share their insights and questions with each other and with the whole class. Through talking and developing a collaborative environment, students feel comfortable asking questions of each other, challenging assumptions, and learning from each other.
- **READ:** Student books, written by the Lawrence Hall of Science, serve multiple purposes: They help students make connections between science concepts and real-world contexts; provide students with secondhand data to analyze; and model science practices, showing real scientists in action. Students also learn to read actively, with explicit instruction on how to record their questions, seek evidence from text, and monitor their understanding as they read.
- **WRITE:** Students in Amplify Science have frequent opportunities to write in order to help them reflect and make sense of what they are learning. Across the program students learn how to express their scientific thinking by leveraging evidence and using relevant vocabulary as they apply their thinking to writing. Frequent reflective writing helps students to gain a deep understanding of scientific arguments and explanations, both of which form the foundation of scientific understanding and expression.
- **VISUALIZE:** Through a combination of simulations (sims), media, hands-on activities, readings, and digital and physical models, students are empowered to visualize scientific phenomena in ways never possible before.

In the classroom, these modalities manifest themselves through carefully designed activities with students planning and conducting investigations, engaging in computational thinking, evaluating information, asking questions and defining problems, analyzing and interpreting data, crafting visual models, and formulating scientific arguments based on evidence they have collected — all through the lens of their investigations of real-world problems.

Evidence

In the grade 5 unit **Modeling Matter**, students start Chapter 2 by doing a hands-on activity in order to obtain, evaluate, and communicate information (SEP 8) about ingredients to be used in a salad dressing. In the next lesson, they do observations using a digital simulation (SEP 2) and talk to each other about patterns they recognized in the simulation. In the third lesson, they will read a book about a boy named Diego, who uses models and visualizations to help his little sister Maya understand dissolving. In the book, Diego also draws models for Maya (SEP 2), so that she can connect what is happening at the molecular scale with what she is observing at the macro scale. In the fourth lesson, students create similar models to construct an explanation (SEP 6) about dissolving, and then write a scientific explanation to explain solubility.

Finding additional evidence

Unit level, refer to:

- 1 **Standards and Goals.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Standards and Goals.” See descriptions of how SEPs and CCCs are integrated with the DCIs.
- 2 **Embedded Formative Assessments.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Embedded Formative Assessments.” Note opportunities for formative assessments that integrate SEPs, CCCs and DCIs.
- 3 **3-D Statements.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “3-D Statements.”

Lesson level, refer to:

- 1 **Standards** (Lesson Brief). Open any lesson in any chapter of any unit. Scroll down to “Standards” line and click the black carrot to expand the section.

Category I: NGSS 3D Design (additional criteria for units only):

If you are evaluating a lesson, it is not necessary to evaluate criteria D–F. Please enter your rating for a single lesson above (after C).

Unit criteria

A unit or longer lesson designed for the NGSS will also include clear and compelling evidence of the following:

Where to find evidence in Amplify Science

(Note: When appropriate, a brief explanation of the location of information/documents in the Amplify Science online Teacher's Guide is provided.)

D Unit coherence

Lessons fit together to target a set of performance expectations.

- i Each lesson builds on prior lessons by addressing questions raised in those lessons; cultivating new questions that build on what students figured out; or cultivating new questions from related phenomena, problems, and prior student experiences.
- ii The lessons help students develop toward proficiency in a targeted set of performance expectations.

Explanation

In conjunction with the iterative process of Do, Talk, Read, Write, Visualize, each successive lesson in a unit furthers student understanding of the phenomena they are investigating, as well as the targeted performance expectations, in a structured and considered way through the use of something we call Progress Builds. Progress Builds, or PBs, define levels in the increasingly complex explanation of a unit's anchoring phenomenon that students should be constructing over the course of the unit. Each PB level integrates and builds upon the knowledge and skills from lower levels. In this way, the unit's PB provides teachers and students with a clear roadmap for how understanding of the unit's anchor phenomenon is expected to deepen and develop over the course of the unit's learning experiences.

The Amplify Science curriculum was constructed to inspire a deep knowledge of the NGSS—not merely touching upon each standard, but truly allowing for a depth of coverage in a variety of modalities for each. PBs are an innovative way to ensure all students develop this deep understanding by aligning instruction and assessment around focused, meaningful, standards-based learning goals. Because PBs carefully consider not only the knowledge students are likely to have at the beginning of a sequence of instruction, but also how those learning experiences will position students for success with future learning opportunities, PBs support a consistent and coherent approach to a single unit of instruction. Structured by the PB, students' explanations of phenomena in each Amplify Science unit build over time through the accumulation of evidence from their investigations within a unit. As students engage in this evidence-gathering, they work toward increasingly sophisticated explanations that evolve with new evidence.

Evidence

See below for examples of Progress Build levels, given for two units. Note how each description of a given PB expands on the one that came before it to include deeper, more sophisticated concepts:

Vision and Light unit (grade 4):

- Progress Build Level 1: Animals use senses to learn about their environment.
 - Description: Animals have sensory structures that allow them to learn about their environment by getting information from it. Learning about the environment helps animals survive.
- Progress Build Level 2: Light allows objects in an environment to become visible to the eye.
 - Description: Animals have sensory structures that allow them to learn about their environment by getting information from it. Learning about the environment helps animals survive. **In order for an animal to get visual information about an object in its environment, light from a source needs to get to the object, reflect off it, and get to the animal's eye with information about the object.**

- Progress Build Level 3: Light receptors in the eye respond to light and the brain forms an image.
 - Description: Animals have sensory structures that allow them to learn about their environment by getting information from it. Learning about the environment helps animals survive. In order for an animal to get visual information about an object in its environment, light from a source needs to get to the object, reflect off it, and get to the animal's eye with information about the object. **After light from the object enters the animal's eye, it hits the light receptors in the eye that respond to the light. The light receptors then send the information about the object from the light to the brain, which processes the information to form an image of the object. Then the brain compares this image to memories to decide which action to take.**
- Progress Build level 4: Light receptors in the eye respond to light and the brain forms an image.
 - Description: Animals have sensory structures that allow them to learn about their environment by getting information from it. Learning about the environment helps animals survive. In order for an animal to get visual information about an object in its environment, light from a source needs to get to the object, reflect off it, and get to the animal's eye with information about the object. After light from the object enters the animal's eye, it hits the light receptors in the eye that respond to the light. The light receptors then send the information about the object from the light to the brain, which processes the information to form an image of the object. Then the brain compares this image to memories to decide which action to take. **The amount of light that the light receptors need in order for the brain to form a clear image is different for different kinds of animals. This is because different kinds of animals have light receptors that are sensitive to different amounts of light. If there is too much or too little light for the type of light receptors an animal has, its brain cannot form a clear image.**

Balancing Forces unit (grade 3):

- Progress Build Level 1: A force is a push or pull that acts between two objects.
 - Description: A force is a push or pull exerted on an object. When something starts or stops moving, that is evidence of a force. Forces always act between two objects.
- Progress Build Level 2: Forces can be touching or non-touching.
 - Description: A force is a push or pull exerted on an object. When something starts or stops moving, that is evidence of a force. Forces always act between two objects. **Forces can be touching or non-touching. Gravity is a non-touching force that acts between Earth and all other objects. Magnetic force is a non-touching force that acts between magnets and some other metal objects.**
- Progress Build Level 3: More than one force can act on an object at the same time. When those forces are balanced, a still object will remain still; when those forces are unbalanced, the object will start to move.
 - Description: A force is a push or pull exerted on an object. When something starts or stops moving, that is evidence of a force. Forces always act between two objects. Forces can be touching or non-touching. Gravity is a non-touching force that acts between Earth and all other objects. Magnetic force is a non-touching force that acts between magnets and some other metal objects. **More than one force can act on an object at a time. If the forces are in opposite directions and of the same strength, the forces are balanced, and a nonmoving object will not start to move. If the forces are in the opposite directions and are not of the same strength, the forces are unbalanced, and the object will move in the direction of the stronger force.**

Finding additional evidence

Unit Level, refer to

- 1 **Progress Build.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Progress Build.”
- 2 **Unit Map.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Unit Map.”
- 3 **Standards and Goals.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Standards and Goals.” See descriptions of targeted performance expectations.

E Multiple science domains

When appropriate, links are made across the science domains of life science, physical science, and Earth and space science.

- i Disciplinary core ideas from different disciplines are used together to explain phenomena.
- ii The usefulness of crosscutting concepts to make sense of phenomena or design solutions to problems *across science domains* is highlighted.

Amplify Science organizes student learning around the exploration and explanation of real-world phenomena. Many real-world phenomena, by their very nature, cross the domain boundaries of life, physical, or earth and space science. When appropriate, strong links are made across the science domains in Amplify Science units.

Evidence

- **Vision and Light** unit (grade 4): Students take on the role of conservation biologists to figure out why a population of Tokay geckos has decreased since the installation of new highway lights in the rainforest. Students use their understanding of vision, light, and information processing to figure out why an increase in light in the geckos' habitat is affecting the population. Doing so requires students to engage with the life science concepts of information processing and structure and function, as well as the physical science idea that light reflecting from objects and entering the eye allows objects to be seen. In addition, because the geckos are affected by new highway lights, repercussions of human impact on the environment, a concept from Earth science is also addressed. The unit thus serves as an excellent example of how real scientists must make linkages across domains in order to solve problems and explain phenomena.
- **Waves, Energy, and Information** unit (grade 4): Students take on the role of marine scientists and work to figure out how mother dolphins communicate with their calves. They write a series of scientific explanations with diagrams to demonstrate their growing understanding of how sound waves travel. Then they apply what they've learned about waves, energy, and patterns in communication to figure out how humans, too, can create patterns that can communicate information over distances. As they solve these problems, students construct a foundational understanding of how waves transfer information from one place to another. In doing so, students learn physical science concepts in tandem with ideas from life science (information processing) and Earth science (solutions to reduce the impact of Earth processes on humans).
- **Patterns of the Earth and Sky** unit (grade 5): Students play the role of astronomers helping a team of archaeologists figure out what the missing piece of a recently discovered artifact might have depicted. As they learn about the sun and other stars and the movement of Earth, students can explain what is shown on the artifact and what might be on the missing piece. In doing so, students learn important concepts from Earth and space science (the universe and its stars; the Earth and solar system) in conjunction with ideas from physical science (gravitational force).

Finding additional evidence

- 1 **Ecosystem Restoration (grade 5), Standards and Goals** unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Standards and Goals.” Note the Physical Science, Earth and Space Science, and Life Science performance expectations addressed by this unit as well as the crosscutting concepts used to help make sense of the phenomenon.
- 2 **Energy Conversion unit (grade 4), Standards and Goals** unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Standards and Goals.” Note the Physical Science, Earth and Space Science, and Life Science performance expectations addressed by this unit as well as the crosscutting concepts used to help make sense of the phenomenon.

F Math and ELA

Provides grade-appropriate connection(s) to the Common Core State Standards in Mathematics and/or English Language Arts & Literacy in history/social studies, science and technical subjects.

Amplify Science provides instructional support for literacy, and provides instructions on how to read scientific texts, write scientific explanations and arguments from evidence, and engage in scientific discourse.

Reading

In Amplify Science, students don't simply read the text and answer the questions that follow. Rather, students are always approaching their readings with a purpose in mind, from looking for pieces of evidence to support their scientific argument, to asking and recording questions as they read through the text.

Evidence:

- **Animal and Plant Defenses** unit (grade 1): In Lesson 2.1, students are led in a Shared Reading of the book *Tortoise Parts*, with the express purpose of gathering information about how tortoises do what they need to do to survive. Using the strategy of visualizations to make sense of the structures in the text, students become acquainted with the idea that animals use specific body parts to meet their survival needs.
- **Modeling Matter** unit (grade 5): In Lesson 2.3, students read the book *Solving Dissolving*, a fictional text about a brother and sister who make lemonade. The teacher first models making inferences with the first few pages of the text. As students read the book with partners, they make inferences about the text, using the images as well as the text to help them understand what they are reading. After reading the book, students record two observations made in the text as well as inferences that they made while reading. Students discuss the models used in the text and how they contribute to an overall understanding of the text.
- **Changing Landforms** unit (grade 2): In Lesson 2.3, students are introduced to a new Investigation Question (*How could water change a landform even though landforms are made of hard rock?*), and participate in a Partner Reading of the informational text *What's Stronger? How Water Causes Erosion*, with the specific purpose of gathering evidence related to the question. The lesson concludes with a class discussion about different examples of landforms and how water can change them, using the book as reference.

Writing

In addition to vocabulary development, students will engage in a variety of writing activities, from quick reflection activities that start the class, to end-of-chapter scientific explanations, and finally, end-of-unit scientific arguments.

Evidence:

- **Inheritance and Traits** unit (grade 3): The pre-unit assessment in Lesson 1.1 is a writing assignment intended to reveal students' initial understanding of the unit's content. Later, in Lesson 1.7, after groups review gathered data, the class works together to write their first scientific explanation to answer the Chapter 1 Question: *Why are wolves different even though they are all the same species?* This allows the teacher to model the scientific practice of constructing explanations. Throughout the unit, students will continue to engage in writing scientific explanations, and will do so with increasing independence. Ultimately, in Lesson 3.6, students construct a final written explanation about why the wolf they have been studying is medium in size.
- **Energy Conversions** unit (grade 4): In Lesson 1.6, students are introduced to the vocabulary word *evidence*, then get practice with the concept by writing a response to the prompt, "Look at the picture of the Ergstown subway on page 17. Name at least two forms of energy that you see evidence of. What is your evidence?" At the end of the lesson, students work in pairs to gather additional evidence for a claim and write their first argument of the unit. Each subsequent chapter also concludes with a written scientific argument.

- **Spinning Earth** unit (grade 1): In Lesson 1.5, students draw and write (using Word Rings) about what two friends see in the sky, and use that information to determine if they live in the same place. The teacher then introduces Interpretation Language Frames and leads students in a Shared Writing about why the sky looks different to Sai than it does to his grandma when they talk on the phone. Teachers record the sentences that students orally compose and then invite students to read these sentences aloud together to consolidate their understanding of the explanations. In the final Shared Writing of the unit, which occurs in Lesson 5.2, the teacher guides students to synthesize their ideas and compose an answer to the Chapter 5 Question: *Why was it nighttime for Sai when he called his grandma during the winter?*

Vocabulary

Developing a robust scientific vocabulary is an important aspect of our approach to literacy development. For each unit, a carefully selected set of conceptually important words has been identified, and students get repeated exposure to these words through multiple modalities: reading, writing, listening, and student-to-student talk.

Evidence:

- **Needs of Plants and Animals** unit (Kindergarten): In Lesson 1.1, teachers use a specific vocabulary routine with students to introduce the word *scientist*. In the exercise, students get the opportunity to hear, see, and say the word, and then connect the word to a student-friendly definition. This routine provides a consistent way to introduce and practice new words as students encounter focal vocabulary throughout the unit.
- **Balancing Forces** unit (grade 3): In Lesson 1.2, students are introduced to the words *force* and *evidence*. First, students engage in a hands-on activity in which they use blocks and everyday materials to explore different ways that one object can push or pull on another object. To build on this experience, the teacher leads a discussion to help students make sense of the class data, defining *force* and guiding students to figure out what *evidence* of a *force* might be from their investigation.
- **Weather and Climate** unit (grade 3): In Lesson 1.2, students are introduced to the word *data*. First, students engage in a hands-on activity in which they explore how to measure rainfall in a way that allows them to compare different amounts of rain. The discussion that teachers lead afterwards codifies the word *data* for students, enabling them to make the connection that the information they recorded in their notebooks is, in fact, *data*. The word continues to be used throughout the unit, such as in Lesson 3.3, when students engage in student-to-student discussion about what they observed in weather data that spans 50 years and three locations.

Discourse

Students in Amplify Science have numerous opportunities for structured student-to-student discourse, with low-stakes and high-stakes opportunities to share ideas, use newly acquired vocabulary, and craft oral scientific arguments.

Evidence:

- **Vision and Light** unit (grade 4): Students participate in a Think-Pair-Share routine to reflect on questions about light receptors and vision. This routine allows students to quickly develop ideas about what they are learning and to discuss those ideas. Think-Pair-Share in Amplify Science is especially beneficial for English learners and other students who may feel reluctant to speak in front of the whole class without preparation.
- **Light and Sound** unit (grade 1): In Lesson 1.3, students participate in a Shared Listening routine in which they think about and discuss the question: *What is another light source that you know of that we did not see on our Light-Source Hunt?* The teacher explains that each partner will have a turn being the speaker and the listener, but that each student can only fulfill one role at a time, and provides language frames to get them started. The Shared Listening routine is used throughout the unit, and is designed to provide students with multiple opportunities to think on their own and then discuss their ideas with a partner as a way to clarify, refine, add to, or change their understanding.

- **Earth's Features** unit (grade 4): In Lesson 1.1, students share what they already know and what questions they have about rocks and fossils, first with a partner then with the whole class, in order to activate prior knowledge and to motivate learning. Teachers emphasize to students that it is okay to not be totally sure of their thinking; that thinking about a topic before students start investigating can help make it easier for them to learn new information. Students responses in the discussion are recorded on an Anticipatory Chart, which will be revisited throughout the unit to give students a chance to reflect on what they have learned about rocks and fossils.

Teachers also have multiple opportunities for math extensions throughout the program.

Evidence:

- **Plant and Animal Relationships** unit (grade 2): In Lesson 1.3, students are introduced to their Investigation Notebooks and use them to record information from the text, *My Nature Notebook*. As a math extension, the Teacher Support Tab of the Instructional Guide suggests, *"To give students practice making bar graphs and analyzing data, have them use the data table on page 15 of My Nature Notebook. Working in pairs, invite students to each make one bar graph. One student should make a bar graph to represent the growth of the young oak tree while the other makes a bar graph that represents the growth of grass. Partners can then describe their graphs to each other. Ask them how the height of the young oak tree and grass have changed over time [...]. The purpose of this activity is to give students practice analyzing and interpreting data using bar graphs."*
- **Pushes and Pulls** unit (Kindergarten): In Lesson 1.4, students install launchers into their Box Models to get pinballs to start moving. As a math extension, the Teacher Support tab of the Instructional Guide includes the suggestion that teachers, *"Engage students in a discussion about the different shapes. Start by asking students to identify the shapes and describe what they see. They will likely identify that the box is shaped like a rectangle, and they will describe its sides. Deepen the conversation by asking students to analyze the shapes. Ask questions such as 'Why do you think the Box Model is shaped like a rectangle?' 'What would happen if we made a pinball machine that is a different shape?' or 'What would be different if we turned the machine sideways?' Repeat this line of questioning with other shapes that students identify with the Box Models [...]. The purpose of thinking in this way is to provide students with experience using informal language as they analyze and compare different sizes and orientations of two- and three-dimensional shapes."*
- **Sunlight and Weather** unit (Kindergarten): In Lesson 2.2, students record the temperature data they collected outside on the Class Playground Temperature chart. As a math extension, the Teacher Support tab of the Instructional Guide suggests, *"Once the class has added data to the Class Playground Temperature Chart, consider inviting students to compose evidence-based results statements using the data. These statements allow students to practice reading graphs to make better sense of the information the graph conveys. For instance, students could say, 'We had 6 mornings that were cold.' More sophisticated statements might say, 'There were 3 more very warm playground surfaces than there were cold playground surfaces.' If time allows consider recording students' statements underneath the graph as a way to support the connection between oral and written language."*

Finding additional evidence:

Unit Level, refer to:

- 1 **Standards and Goals.** Open any unit. Click "JUMP DOWN TO UNIT GUIDE" link, then click "Standards and Goals." Scroll to bottom for Math and ELA standards addressed.
- 2 **Standards at a Glance.** Open any unit. Click "JUMP DOWN TO UNIT GUIDE" link, then click "Standards at a Glance."

Category II: NGSS Instructional Supports (lessons and units):

The lesson/unit supports three-dimensional teaching and learning for ALL students by placing the lesson in a sequence of learning for all three dimensions and providing support for teachers to engage all students.

Lesson and unit criteria

Lessons and units designed for the NGSS include clear and compelling evidence of the following:

A Relevance and authenticity

Engages students in authentic and meaningful scenarios that reflect the practice of science and engineering as experienced in the real world.

- i Students experience phenomena or design problems as directly as possible (firsthand or through media representations).
- ii Includes suggestions for how to connect instruction to the students' home, neighborhood, community and/or culture as appropriate.
- iii Provides opportunities for students to connect their explanation of a phenomenon and/or their design solution to a problem or to questions from their own experience.

Where to find evidence in Amplify Science

In every unit of Amplify Science, students are asked to inhabit the role of a scientist or engineer in order to investigate a real-world problem. These real-world problems provide relevant, 21st-century contexts through which students will investigate different scientific phenomena. Students work to define the problem and collect and make sense of evidence from multiple sources and through a variety of modalities. At the end of the unit, students are presented with a brand-new problem, giving them an opportunity to apply what they've learned over the course of the unit to a new context.

Evidence:

- **Animal and Plant Defenses** unit (grade 1): Spruce the Sea Turtle lives in an aquarium and will soon be released back into the ocean, where she will survive despite ocean predators. In their role as marine scientists, students apply their understanding of plant and animal defense structures to explain to aquarium visitors how a sea turtle and her offspring can defend themselves from ocean predators when they are released into the wild.
- **Modeling Matter** unit (grade 5): Students take on the role of food scientists working for the fictional Good Food Production, Inc., where they are challenged to solve two problems: One problem requires them to separate a mixture (in order to determine if a potentially harmful food dye is present in a mixture the company produces), and the other requires them to make unmixable substances mix (to create a salad dressing that has no sediment and doesn't split into layers). In so doing, students figure out that the properties of materials are related to the properties of the nano-particles that make up those materials.
- **Earth's Features** unit (grade 4): A mysterious fossil is discovered in a canyon within the fictional Desert Rocks National Park. Playing the role of geologists, students help the director of Desert Rocks National Park explain how and when a particular fossil formed and how it came to be in its current location. Students figure out what the environment of the park was like in the past and why it has so many visible rock layers.

Finding additional evidence:

Unit Level, refer to:

- 1 **Unit Overview.** Open any unit. Click "JUMP DOWN TO UNIT GUIDE" link, then click "Unit Overview." Notice the What? How? Why? paragraphs.
- 2 **Unit Map.** Open any unit. Click "JUMP DOWN TO UNIT GUIDE" link, then click "Unit Map."

B Student ideas

Provides opportunities for students to express, clarify, justify, interpret, and represent their ideas and respond to peer and teacher feedback orally and/or in written form as appropriate.

As previously mentioned, Amplify Science is rooted in the research-based Do, Talk, Read, Write, Visualize approach. This learning approach presents students with multiple modalities to both figure out the unit's scientific phenomena and articulate their understanding.

For example:

- Student-to-student discourse is a key indicator of a productive learning environment, and talking is a key modality for instruction in an Amplify Science class. This is more than just partner activities or group work. For example, reading activities are followed by a student-to-student discussion where students share their insights and questions with each other and with the whole class. Through talking and developing a collaborative environment, students feel comfortable asking questions of each other, challenging assumptions, and learning from each other.
- Evidence
 - **Ecosystem Restoration** unit (grade 5): In Lesson 1.8, students draw upon what they have been learning about how matter moves through an ecosystem to explain why plants are key for the health of the animals in the project area. This activity, an Evidence Circle, engages students in small-group, student-led discussions about one or more claims. The goal of Evidence Circles is for students to discuss how evidence supports a claim and to gain practice connecting different pieces of evidence together to make a strong argument. Evidence Circles also provide an opportunity for students to collaboratively reason through ideas and practice using the language of argumentation. Students gain more practice with the Evidence Circle routine later in the unit, in Lesson 2.7 and 3.6.
 - **Balancing Forces** unit (grade 3): Lesson 1.2 includes a Think-Pair-Share routine. In it, students reflect on a series of questions about the unit's anchoring phenomenon of magnetic levitation trains, thinking about how the trains rise off the tracks, float, and fall back down to the tracks. They then share their thoughts with a partner and discuss each other's ideas.
 - **Changing Landforms** unit (grade 2): In Lesson 3.4, students engage in the Building on Ideas discourse routine, where one partner begins an explanation and the second partner repeats their explanation and builds upon it (then partners switch for a second question).
- Students in Amplify Science have frequent opportunities to write in order to help them reflect and make sense of what they are learning. Across the program students learn how to express their scientific thinking by leveraging evidence and using relevant vocabulary as they apply their thinking to writing. Frequent reflective writing helps students to gain a deep understanding of scientific arguments and explanations, both of which form the foundation of scientific understanding and expression.
- Evidence:
 - **Environments and Survival** unit (grade 3): In Lesson 1.5, students are introduced to the genre of scientific explanation writing, and to several guidelines for writing explanations. The class works together to help the teacher write a scientific explanation for the Chapter 1 Question: *Why are the snails with yellow shells not surviving well?* As the unit progresses, students are expected to take on more and more aspects of composition, ultimately writing their own scientific explanation in Part 1 of the End-of-Unit Assessment in Lesson 3.4.
 - **Properties of Materials** unit (grade 2): In Lesson 1.8, students gain experience writing and supporting a design argument with appropriate evidence. This is the second argument students will have written in the unit so far using the Providing Evidence template. This activity therefore provides a good opportunity for a formative assessment of students' ability to construct an argument by supporting their claims with evidence.
 - **The Earth System** unit (grade 5): In Lesson 2.2, students engage in a hands-on investigation, then observe, record, and make sense of the results through writing and drawing.

- Digital and paper modeling tools empower students to create, and later revise, visualizations of their understandings of key scientific phenomena at critical points in the curriculum.
- Evidence:
 - **Animal and Plant Defenses** unit (grade 1): In Lesson 2.3, students make the first in a series of models to explain animal and plant defenses. Partners explore the reference book to observe how animals and plants use their structures to not be eaten. Students reflect on what they observed in the reference book before using a ball of clay, a comb, and a variety of materials to model how animals and plants might use their structures to defend themselves. The teacher demonstrates how to draw a model structure in the Investigation Notebook and how to use a Word Ring to label the drawing. Then, students choose one of their model structures to draw and label in their notebooks. The teacher introduces the scientific practice of modeling and uses a chart to record what the class learned from each model they created.
 - **Modeling Matter** unit (grade 5): In Lesson 3.5, after observing an emulsifier, students make initial nanovision drawings of what they think is happening to the molecules of oil, vinegar, and lecithin to create a stable mixture. Drawing these models helps students think through and make visible their current mental models of how emulsifiers work. In Lesson 3.6, pairs of students work together to use the digital Modeling Matter Diagramming Tool to revise their initial hand-drawn models of emulsifier. Pairs then swap models and evaluate one another's models based on how well the models represent what the class has learned.
 - **Earth's Features** unit (grade 4): The Formation Modeling Tool activity in Lesson 1.6 allows students to show their understanding about how fossils form inside sedimentary rock. This digital model requires students to synthesize the ideas they have constructed about how a fossil forms over time and how sediment settles, piles up, compacts, and cements to form a rock layer. Students will revisit the digital modeling tool to demonstrate their increasingly sophisticated understanding of rock formation in Lessons 3.2 and 4.4.

Finding additional evidence:

Unit Level, refer to:

- 1 **Program Guide.** Click the Global Navigation button on the left hand side of the digital curriculum. Open the Program Guide and click "Designed for the NGSS," then "Our Approach." This section will detail Amplify Science's Do, Talk, Read, Write, Visualize pedagogical approach.
- 2 **Lesson Overview Compilation.** Open any unit. Click "JUMP DOWN TO UNIT GUIDE" link, then click "Lesson Overview Compilation." Scroll to the last few lessons listed; every unit ends in an individual writing activity, where students draft their scientific arguments based on evidence they have collected, making clear their reasoning that connects evidence to one of a number of claims.

Lesson Level, refer to:

- 1 **Activities.** Open several lessons and review activities within the lesson for multiple examples of writing, peer discussion, responding to teacher or peer feedback in writing revisions, modeling, etc. Note how students are provided with frequent opportunities to express their prior knowledge.

C Building progressions

Identifies and builds on students' prior learning in all three dimensions, including providing the following support to teachers:

- i Explicitly identifying prior student learning expected for all three dimensions.
- ii Clearly explaining how the prior learning will be built upon.

As previously mentioned, through the iterative process of Do, Talk, Read, Write, Visualize, each successive lesson in a unit furthers student understanding of the phenomena they are investigating (and the targeted performance expectations) in a structured and considered way through the use of something we call Progress Builds (PBs). PBs are explicitly designed cognitive models for a given unit that express how students will develop their knowledge and competence in the domain.

Amplify Science measures how well students can explain how and why things happen as they do, rather than merely measuring students' ability to describe science phenomena or recall isolated facts. This explanatory understanding of the world forms the basis for the levels of a PB. Each PB level characterizes an increasingly complex causal explanation of the unit's phenomenon. Each level also builds upon the knowledge and skills from lower levels toward a more complete, mechanistic understanding of that phenomenon.

Evidence:

- **Sunlight and Weather** unit (kindergarten) Progress Build levels are as follows (note how each description of a given PB expands on the previous PB's description):
 - Progress Build Level 1: Surfaces get warm in sunlight.
 - Description: When light from the sun shines on a surface, the surface gets warmer.
 - Progress Build Level 2: Temperature increases with time in sunlight.
 - Description: When light from the sun shines on a surface, the surface gets warmer. **The longer that sunlight shines on the surface, the warmer it gets.**
 - Progress Build Level 3: Dark colored surfaces get warmer in sunlight.
 - Description: When light from the sun shines on a surface, the surface gets warmer. The longer that sunlight shines on the surface, the warmer it gets. **If the surface is a dark color, it will get warmer than a surface that is a pale color when sunlight shines on it.**
- **Properties of Materials** unit (grade 2) Progress Build levels are as follows (note how each description of a given PB expands on the previous PB's description):
 - Progress Build Level 1: Different materials have different properties.
 - Description: Materials are the stuff that makes up everything. Materials have properties. These properties are observable things such as color, texture, smell, and taste. Different materials have different properties.
 - Progress Build Level 2: Mixtures have different properties, depending on their ingredients.
 - Description: Materials are the stuff that makes up everything. Materials have properties. These properties are observable things such as color, texture, smell, and taste. Different materials have different properties. **Sometimes a material is made of a combination of other materials; we call this combination a mixture, and we call the materials that make it up substances. Some mixtures have different properties, depending on their ingredients.**
 - Progress Build Level 3: Heating or cooling a substance can change it to a new substance.
 - Description: Materials are the stuff that makes up everything. Materials have properties. These properties are observable things such as color, texture, smell, and taste. Different materials have different properties. Sometimes a material is made of a combination of other materials; we call this combination a mixture, and we call the materials that make it up substances. Some mixtures have different properties, depending on their ingredients. **Properties of substances can change when they are heated or cooled, so they have different properties when they return to their original temperature. Other substances remain the same, so they have the same properties when they return to their original temperature.**

Finding additional evidence:

Unit Level, refer to:

- 1 Standards and Goals.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Standards and Goals.” See section titled, How This Unit Fits Into the Amplify Science Program, which describes the unit’s place in the trajectory of core ideas and the prerequisite knowledge.
- 2 Progress Build.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Progress Build.” See section that describes “Prior knowledge (preconceptions).”

Lesson Level, refer to:

- 1 Review the first several Activities in each chapter** for use of prior knowledge. Prior knowledge is often addressed in the Daily Written Reflection. Access the Instructional Guide within an Activity for detailed information.

D Scientific accuracy

Uses scientifically accurate and grade-appropriate scientific information, phenomena, and representations to support students’ three-dimensional learning.

Authored by the scientists and science education experts at University of California, Berkeley’s Lawrence Hall of Science, Amplify Science presents students with the most up-to-date scientific content, delivered in an intuitive and organized way. Given the digital delivery method of the curriculum, the Amplify Science team is committed to continuing to update the program to stay abreast of the latest scientific developments.

Content within Amplify Science has undergone extensive field tests in schools across the United States, with more than 400 teachers and 34,000 students participating. Furthermore, the Lawrence Hall of Science has incomparable access to scientists working in the fields of study included in the curriculum. Each unit has been reviewed and approved by this outside network of scientists.

Every unit in Amplify Science has students taking on the role of a scientist or engineer in order to investigate a real-world, phenomena-based problem. Students make the leap from “learning about” to “figuring out” scientific concepts by exploring them in depth. Through a variety of immersive experiences, both physical and digital, students conduct investigations, create and critique models, and gather evidence to support claims.

Unit Level, refer to:

- 1 Science Background.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Science Background.”
- 2 Books in this Unit.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Books in this Unit.”

Lesson Level, refer to:

- 1 Activities.** Review Activities, and associated Instructional Guide content, within a variety of lessons for various information, phenomena, and experiences of 3D learning. The Teacher Support tab within the Instructional Guide will often provide additional detailed scientific information.

A note on curriculum development: Every unit in Amplify Science had one or more expert science reviewers who provided input to the initial approach to the development of the unit and reviewed unit content for accuracy.

E Differentiated instruction

Provides guidance for teachers to support differentiated instruction by including:

- i Appropriate reading, writing, listening, and/or speaking alternatives (e.g., translations, picture support, graphic organizers, etc.) for students who are English learners, have special needs, or read well below the grade level.
- ii Extra support (e.g., phenomena, representations, tasks) for students who are struggling to meet the targeted expectations.
- iii Extensions for students with high interest or who have already met the performance expectations to develop deeper understanding of the practices, disciplinary core ideas, and crosscutting concepts.

Amplify Science units provide many varied learning opportunities as well as timely supports to ensure that diverse learners can be successful with the language and content demands of science, ultimately becoming more independent learners and thinkers.

To support teachers in providing the best possible instruction, every lesson includes a Differentiation section in the Lesson Brief. The **Differentiation Brief** describes what is built into the lesson to support diverse learning needs; highlights potential challenges teachers should be aware of; and provides specific strategies for differentiating instruction. The Differentiation Brief contains the following sections:

- **Embedded Supports for Diverse Learners:** Every unit is designed with diverse learners in mind, with the goal of providing rigorous yet accessible science instruction. Each lesson is intentionally planned to provide multiple entry points for students, and to enable all students to be successful with all of the activities. This section of the Differentiation Brief highlights the scaffolds already embedded within the lesson so that teachers can take advantage of the power of these carefully designed activities.
- **Potential Challenges in This Lesson:** This section of the Differentiation Brief highlights aspects of the lesson that may present particular cognitive, linguistic, or social challenges for students.
- **Specific differentiation strategies for English Language Learners:** This section of the Differentiation Brief points out activities that could pose linguistic challenges for English learners or reduce their access to science content, and suggests supports and modifications accordingly. Suggestions include linguistic supports to bolster students' understanding of science content, supports for engaging with science texts, ideas for helping students participate in discussions, multiple ways students can express their ideas in writing, and more.
- **Specific differentiation strategies for students who need more support:** Every lesson includes ways for teachers to support those students who are struggling or who have special needs. These additional scaffolds are to be used entirely at the discretion of the teacher, and provide targeted suggestions tailored for the activities in that particular lesson.
- **Specific differentiation strategies for students who need more challenge:** Every lesson has ways for a teacher to expand upon the lesson, or go beyond the scope of what is expected in that lesson. This section of the Differentiation Brief provides suggestions that allow students to engage with content more deeply, explore the material with a new purpose, pursue more independent research on a topic, and more.

The aim of the Amplify Science program is for all students to develop a deep understanding of science concepts as well as an aptitude with the science and engineering practices that are essential to the work of scientists and engineers. It is important to recognize that every classroom is composed of students with diverse learning needs, however, and that these can vary widely within and across classrooms. Amplify Science units therefore provide many varied learning opportunities as well as timely supports (detailed above) to ensure that diverse learners can be successful with the language and content demands of science. The goals of all instructional supports provided in the program, whether embedded or optional, are to:

- Access and build students' background knowledge.
- Provide explicit instruction in the language of science and engineering.
- Foster language development without diluting science content.
- Provide multiple means of accessing science content.
- Give students a sense of ownership in their learning.

Finding additional evidence:

Lesson level, refer to:

- 1 **Differentiation Brief** (Lesson Brief). Open any lesson in any chapter of any unit. Scroll down to “Differentiation” line and click the black carrot to expand the section.
- 2 **Bilingual Glossary** (Lesson Brief). Open any lesson in any chapter of any unit. Go to “Digital Resources” area on righthand side. Click the Bilingual Glossary within the list of resources.

Category II: NGSS Instructional Supports (additional criteria for units only)

If you are evaluating a lesson, it is not necessary to evaluate criteria F–G. Please enter your rating for a lesson above (after E).

Unit Criteria

A unit or longer lesson designed for the NGSS will also include clear and compelling evidence of the following:

Where to find evidence in Amplify Science

F Teacher Support for unit coherence

Supports teachers in facilitating coherent student learning experiences over time by:

- i Providing strategies for linking student engagement across lessons (e.g., cultivating new student questions at the end of a lesson in a way that leads to future lessons, helping students connect related problems and phenomena across lessons, etc.).
- ii Providing strategies for ensuring student sense-making and/or problem-solving is linked to learning in all three dimensions.

Grounded in each unit's Progress Build (described above), ample teacher support is provided at all levels of Amplify Science to further connect all lessons to each other in a meaningful and thoughtful way. The teacher edition includes a wealth of resources through which Amplify Science teachers can develop and extend their knowledge, including the following:

- **Unit-level resources**
 - Unit Overviews
 - Lesson Summaries
 - Standards and Goals Overviews
 - Science Background information
 - Getting Ready to Teach information
 - Assessment System Overview
- **Embedded teacher supports in the lessons**
 - Differentiation strategies for each lesson
 - Teacher Support notes for activities within the lessons, including background knowledge on the scientific information being taught, pedagogical rationale, and suggestions on technology usage
 - Clear step-by-step instructions for each activity
- **Help Desk**
 - Available by phone, email, or online chat
 - Able to answer technology questions, adjust student rosters as needed, or contact Lawrence Hall of Science with content-related questions
- **Program Guide**
 - Free website containing information on the program pedagogy (Do, Talk, Read, Write, Visualize), the structure of the courses, how English learners were considered in the curriculum's development, tutorial videos, FAQs, and more

G Scaffolded differentiation over time

Provides supports to help students engage in the practices as needed and gradually adjusts supports over time so that students are increasingly responsible for making sense of phenomena and/or designing solutions to problems.

Amplify Science units are designed with the Gradual Release of Responsibility model—there is an emphasis on teacher modeling and direction at the beginning of the unit, but many of the scaffolds that existed earlier in the unit are thoughtfully and meaningfully removed as the unit progresses.

Evidence:

- **Plant and Animal Relationships** unit (grade 2): In Lesson 1.6, the teacher introduces students to the conceptual meaning of the word *measure*. After a brief class discussion about why scientists measure and the various tools they use to do so, students use rulers to complete their first measurements as a class. Throughout the unit, students gain more and more practice with investigations and analyzing results with measurements. In Lesson 3.3, student pairs dissect models of bird droppings to practice their measurement skills more independently (counting droppings and counting seeds inside droppings) and to consolidate their understanding of how seeds could end up in new places in a habitat. In Lesson 4.2, student pairs work together to set a purpose for investigating in the Fluffy Seed Investigation, and decide how they will measure in the investigation.
- **Balancing Forces** unit (grade 3): Students read the book *Forces All Around* in Lesson 1.3. In this lesson, the reading experience is heavily scaffolded, with clear teacher modeling and very specific instructions for the students. By the end of the unit, in Lesson 4.4, students read their last book *Explaining a Bridge* and provide their own purpose for reading the book with minimal teacher-provided scaffolding.
- **Earth's Features** unit (grade 4): In Lesson 1.6, students are introduced to the features of a scientific argument in a discourse routine called Evidence Circles. Students receive evidence and have small group discussions about how the evidence supports the claim that Desert Rocks National Park used to be underwater. Afterwards, with input from the students, the teacher models writing a scientific argument about what Desert Rocks National Park was like in the past. The Evidence Circles discourse routine continues to be used throughout the unit, with less and less instruction from the teacher. Ultimately, in Lessons 4.5, students engage in Evidence Circles to discuss new evidence about Desert Rocks Canyon and Keller's Canyon and work together to make a claim about why more rock layers were exposed in Desert Rocks Canyon. This prepares them for writing a scientific argument on their own, which serves as Part 2 of the End-of-Unit Assessment.

Category III: Monitoring NGSS Student Progress (lessons and units)

The lesson/unit supports monitoring student progress in all three dimensions of the NGSS as students make sense of phenomena and/or design solutions to problems.

Lesson and unit criteria

Lessons and units designed for the NGSS include clear and compelling evidence of the following:

Where to find evidence in Amplify Science

A Monitoring 3D student performances

Elicits direct, observable evidence of three-dimensional learning; students are using practices with core ideas and crosscutting concepts to make sense of phenomena and/or to design solutions.

The Amplify Science assessment system is grounded in the principle that students benefit from regular and varied opportunities to demonstrate understanding through performance. In practice, this means that for the overwhelming majority of assessment opportunities in each unit, student conceptual understanding is revealed through engagement in the science and engineering practices. For example, each grade level includes one Investigation Assessment, a student-led investigation experience designed to enable students to demonstrate a range of science and engineering practices as they plan and conduct investigations of scientific phenomena.

This commitment to multidimensional, NGSS-aligned performance is clear in the embedded assessment opportunities that occur in nearly every lesson: Students investigate phenomena, construct scientific explanations, develop and use models, and engage in argument as a core part of the *problem-based deep dives* in each unit. While it is not feasible for every assessment opportunity to provide information about student progress along each dimension, careful consideration is given to ensure that each unit includes multiple opportunities to provide evidence of understanding of the focal concepts and practices in a given unit, as well as instructional suggestions for taking action based on that evidence.

Evidence:

- **Inheritance and Traits** unit (grade 3): In Lesson 3.5, students employ the practice of creating models to demonstrate their understanding of the core ideas of how the environment influences traits, including inherited traits, in the context of the crosscutting concept of cause and effect. The activity contains use of a digital modeling tool that allows students to collect and analyze data, which they then use to engage in classroom discussions.
- **Pushes and Pulls** unit (kindergarten): In Lesson 1.4, students are introduced to the Box Model they will use throughout the unit as they work to design a solution for how to create a pinball machine that can make the pinball move in all the ways they want it to. After a hands-on activity in which students install launchers in their Box Models, students make sense of forces in the model by creating a diagram of their Box Model. They also create a record of their initial design that they can refer to for later changes. These written diagrams (SEP), in conjunction with their oral responses to Clipboard Assessment questions, provide evidence of students' understanding that movement is caused (CCC) by a force (DCI) from another object.
- **Patterns of Earth and Sky** unit (grade 5): In Lesson 4.3, students follow plans they made in the previous lesson as they conduct their investigations and look for patterns in the data. After 15 minutes, they reflect with their partners about the challenges they faced while investigating and then share and receive support in a whole-class setting. Student pairs revise their investigation plans and conduct the investigation again. Students reflect on the role of revision in investigation and think about how professional scientists often have to change their investigation plans along the way. This investigation serves as an assessment that is designed to reveal students' facility with the performances of Planning and Conducting Investigations and Analyzing and Interpreting Data, and with their understanding of unit-specific science concepts, and the crosscutting concept of Patterns.

Finding additional evidence:

Unit level, refer to:

- 1 **Assessment System.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Assessment System.”
- 2 **Embedded Formative Assessments.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Embedded Formative Assessments.”

B Formative

Embeds formative assessment processes throughout that evaluate student learning to inform instruction.

The variety of formative assessment options for Amplify Science include:

- **Pre-Unit Assessment** (formative): Written responses.
- **On-the-Fly Assessments (OtFA)** (formative): 3–4 per chapter; each OtFA includes guidance on what to look for in student activity or work products, and offers suggestions on how to adjust instruction accordingly.
- **End-of-chapter scientific explanations** (formative): Three-dimensional performance tasks to support students' understanding of ideas encountered in each chapter.
- **Self-assessments** (formative): One per chapter; brief opportunities for students to reflect on their own learning, ask questions, and reveal ongoing thoughts about unit content.
- **Critical Juncture Assessment (CJ)** (formative): Occurring at the end of each chapter, similar in format to the Pre-Unit and End-of-Unit Assessments, a CJ signifies a point in the unit at which it is especially important that all students understand the content before continuing.

Evidence:

- **Plant and Animal Relationships** unit (grade 2): In Lesson 2.4, students explore a digital app that helps them gather first-hand evidence about good places for new seeds to grow. Afterwards, they engage in the first part of an embedded Critical Juncture Assessment. In this CJ, students review an image and add a circle to it in a location they think is a good place for a new plant to grow, and an X in a location they think is a not a good place for a new plant to grow. They also indicate their reasoning for each marking by answering two written questions. Their responses reveal their current level of understanding regarding the core idea that in order to grow, plants need to be in places where there is enough space. Teachers are provided guidance on interpreting students' responses, as well as how to tailor ensuing instruction based on what is revealed.
- **Light and Sound** unit (grade 1): In this unit, students take on the role of light and sound engineers for a puppet show company as they investigate cause and effect relationships to learn about the nature of light and sound, and apply what they learn to design shadow scenery and sound effects for a puppet show. The first activity of Lesson 3.6 includes an On-the-Fly Assessment in which students use language frames to articulate an explanation of their final designs for a puppet-show scene, completed in the previous day's lesson. As students are explaining to their partner how their stencil design made elements of their puppet-show scenes bright, medium bright, and dark, teachers listen for how they are using the causal language (*so, because*) in order to relate the amount of light passing through to the surface. Guidance is provided to teachers in terms of what to look/listen for, as well as how to proceed with instruction based on what they notice.
- **Weather and Climate** unit (grade 3): In Lesson 2.5, students work in groups to consider possible claims, discuss new evidence, and decide which claim is best supported by the evidence. Afterwards, students learn of two new guidelines for writing scientific arguments, then write their own arguments in which they use scientific language to support the claim with evidence. This activity concludes Chapter 2 and gives teacher's insight into their students' developing understanding of unit concepts. Two rubrics are provided to aid teachers in interpreting students' performance in all three dimensions, information that can be used to inform instruction.

Finding additional evidence:

Unit level, refer to:

- 1 **Embedded Formative Assessments.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Embedded Formative Assessments.”

C Scoring guidance

Includes aligned rubrics and scoring guidelines that provide guidance for interpreting student performance along the three dimensions to support teachers in (a) planning instruction and (b) providing ongoing feedback to students.

Guidance on interpreting student performance along the three dimensions is included in all Amplify Science units. Categories of evaluation guidance found throughout the program include:

- **Assessment guides/rubrics:** Guidance is provided to gauge the level of student performance on the assessment task, with suggestions for student feedback and questioning strategies to advance learning, revise performance, or elicit and clarify student thinking. Assessment guides/rubrics are available as a digital resource in the Lesson Brief for the lesson in which the task occurs.
- **Possible student responses:** Possible student responses are provided to model how evidence of understanding, or partial understanding, may be demonstrated by the student for the specific task. Possible student responses are provided in the Possible Responses tab in the activity where there is an applicable notebook page. Possible student responses also appear in the Assessment Guide for the End-of-Unit Assessment (in Digital Resources).
- **Look for/Now what? notes:** Each On-the-Fly Assessment includes a two-part description of what evidence of understanding would look like for the task (Look for) and how instruction may be adjusted in response (Now what?). These are accessible by pressing the orange hummingbird icon in the activity in which they appear.
- **Assess understanding/Tailor instruction notes:** Each Critical Juncture Assessment includes a two-part description of how the expected level of student understanding may be demonstrated in the task (Assess understanding) and how instruction may be adjusted in response (Tailor instruction) at the class, group, and student level. These are accessible by pressing the orange hummingbird icon for the activity in which they appear.

Evidence:

- **Ecosystem Restoration** unit (grade 5): For the End-of-Unit Assessment in Lesson 3.7, students write final scientific arguments in response to the same prompt as they responded to in the Pre-Unit Assessment. Students' arguments provide an opportunity to assess their level of understanding of the core concepts from the unit, as specified in the Progress Build, and provide evidence of growth over time when compared with their pre-unit writing. Students' arguments also reveal students' developing facility with the practice of engaging in argument from evidence. In the “Guide to Assessing Students' End-of-Unit Arguments” (located in Digital Resources for Lesson 3.7), two rubrics are provided for assessing students' writing along several dimensions. These dimensions include attention to students' understanding about how energy and matter flows in an ecosystem, students' knowledge of how parts of an ecosystem interact, and students' abilities to construct scientific arguments from evidence.

- **Energy Conversions** unit (grade 4): In Lesson 1.6, students gather additional evidence to support a claim and write their first argument of the unit. The Possible Responses tab of the Instructional Guide provides teachers with example responses. In addition, the On-the-Fly Assessment reference information guides teachers with the following information: “As students are recording evidence, notice if they are including evidence that is relevant to the claim and that also comes from one of the sources designated on the notebook page. Since this is students’ first experience in this unit with providing evidence to support a claim, it is acceptable at this stage if not all students have mastered this. If you find that many of your students are including irrelevant evidence or writing down their own opinions rather than evidence from a specific unit source, you may decide to add in further discussion after students complete pages 18–19, ‘Writing an Argument About the Blackout,’ in the notebook. You may also choose to present a student work example that includes evidence supporting the claim and talk through why the evidence is relevant and where it came from.”
- **Changing Landforms** unit (grade 2): In Lesson 1.1, students are presented with a rock arch in the ocean and are told that the hole in the arch has gotten bigger over time. Students are asked to explain why the hole got bigger. This pre-unit writing assessment is an opportunity for students to articulate their initial ideas about why and how landforms can change over time. This will allow the teacher to draw connections to students’ experiences and to watch for alternate conceptions that might get in the way of students’ understanding. In “Guide to Interpreting Students’ Pre-Unit Explanations” (in Digital Resources for Lesson 1.1), guidance is provided to help the teacher draw insights into students’ initial thinking about the content. The Guide includes examples of students’ experiences that the teacher can connect to activities in the unit, ideas students may have about rock, and alternate conceptions to watch out for.

Finding additional evidence:

Unit level, refer to:

- 1 **Assessment System.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Assessment System.”
- 2 **Embedded Formative Assessments.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Embedded Formative Assessments.”

Lesson level, refer to:

- 1 **“Guide for Assessing Students’ End of Unit Explanations” PDF.** The Assessment System information mentioned above will indicate the lesson in which the End-of-Unit Assessment is located. Open that lesson. Then navigate to the “Digital Resources” area on the right hand side, then click ‘Guide for Assessing...’ within the list of resources.
- 2 Explore the **Activities** in any lesson, and the associated Instructional Guide content. Also see “Possible Response” tab for the activity, where scoring guidance is provided if applicable.

D Unbiased tasks/items

Assesses student proficiency using methods, vocabulary, representations, and examples that are accessible and unbiased for all students.

Amplify Science’s multiple measure approach to assessment is designed to minimize bias by providing a wide variety of opportunities for students to demonstrate understanding—not just text, but also talk, diagramming and modeling, and hands-on (especially for early elementary) modalities.

Evidence

- **Needs of Plants and Animals** unit (kindergarten): Lesson 1.6 contains a kinesthetic On-the-Fly Assessment in which students first search for milkweed in pictures, then physically move to different habitat stations in the classroom when the teacher prompts, “Now pretend you are a monarch caterpillar. Which habitat would you live in, the field of weeds or the forest with pine trees and water lilies?” Their selection of a habitat for the caterpillars is an opportunity to assess students’ understanding that animals can only live in a place with the food they need. The “Chapter 1: Clipboard Assessment Tool” is available as a reference for key questions and a place to record notes on students’ responses.

- **Waves, Energy, and Information** unit (grade 4): In Lesson 4.4, students apply their understanding of sound waves and patterns in digital communication to complete an end-of-unit writing task. In this three-dimensional performance task, students construct explanations for how patterns in the motion of air particles allow sound to travel as a wave from the computer to Maria. Students also analyze and interpret data as they use the waveform of the sound from the computer to explain why the music suddenly surprised her. To assess students' written explanations—as a performance of the practice of constructing explanations and of their understanding of the concepts being explained—three rubrics are provided. Rubric 1 is designed to formatively assess the practice of constructing explanations. Rubric 2 may be used summatively to assess students' understanding of the science ideas encountered in the unit. Rubric 3 may be used summatively to assess students' application of the crosscutting concept of Patterns as applied to a specific phenomenon.
- **Spinning Earth** unit (grade 1): In Lesson 5.3, the culminating lesson of the unit, the teacher sits with students one at a time and prompts them to explain a sequence of images from the book *What Spins?* that show the sky at five different times of day. The teacher also asks students to look at a set of data organizers from the unit, to describe a pattern that they see in one of the organizers, and to describe how one of the organizers helped them to see a pattern. These one-on-one conversations are an opportunity to assess students' progress toward the core learning goals of the unit—their understanding of discipline-specific concepts, their application of the crosscutting concept of Patterns, and their developing facility with organizing data to see patterns, which is a key practice of science and engineering.

In addition to the multiple measure approach, all assessments are carefully reviewed to improve accessibility and to eliminate bias. The review process was supported by psychometricians, assessment experts, science educators, literacy experts, and educators with deep experience in the grade level in which particular assessments occur.

Last, as a part of this process to create unbiased assessments, language in assessment items was carefully chosen to be grade-level appropriate and to avoid the common pitfalls of assessment design, like false cognates and complex grammatical structure or tense. As an important element of construct validity, contexts used for assessment items and performance tasks are carefully chosen to avoid advantaging or disadvantaging students from different backgrounds—Amplify Science aims for student performance to be a function of the understanding and practices being learned and assessed, not the set of experiences they are familiar with.

Finding additional evidence:

Unit level, refer to:

- 1 **Assessment System.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Assessment System.”
- 2 **Embedded Formative Assessments.** Open any unit. Click “JUMP DOWN TO UNIT GUIDE” link, then click “Embedded Formative Assessments.”

Category III: Monitoring NGSS Student Progress (additional criteria for units only)

If you are evaluating a lesson, it is not necessary to evaluate criteria E–F. Please enter your rating for a lesson above (after D).

Unit criteria

A unit or longer lesson designed for the NGSS will also include clear and compelling evidence of the following:

Where to find evidence in Amplify Science

E Coherent assessment system

Includes pre-, formative, summative, and self-assessment measures that assess three-dimensional learning.

The assessment system for each Amplify Science unit is designed to provide teachers with actionable diagnostic information about student progress toward the learning goals for the unit. Assessment of unit learning goals is grounded in the unit's Progress Build, which describes how student understanding is likely to develop and deepen through engagement with the unit's learning experiences. The assessment system includes formal and informal opportunities for students to demonstrate understanding and for teachers to gather information throughout the unit — all while giving teachers flexibility in deciding what to score and what to simply review. Built largely around instructionally embedded performances, these opportunities encompass a range of modalities that, as a system, attend to research on effective assessment strategies and the NRC Framework for K–12 Science Education.

The variety of assessment options for Amplify Science include:

- **Pre-Unit Assessment** (formative): Written or oral responses.
- **On-the-Fly Assessments (OtFA)** (formative): 3–4 per chapter; each OtFA includes guidance on what to look for in student activity or work products, and offers suggestions on how to adjust instruction accordingly.
- **End-of-chapter scientific explanations** (formative): Three-dimensional performance tasks to support students' understanding of ideas encountered in each chapter.
- **Self-assessments** (formative): One per chapter; brief opportunities for students to reflect on their own learning, ask questions, and reveal ongoing thoughts about unit content.
- **Critical Juncture Assessment (CJ)** (formative): Occurring at the end of each chapter, similar in format to the Pre-Unit and End-of-Unit assessments.
- **End-of-Unit Assessment** (summative): Written responses.
- **Benchmark Assessments**: Delivered three to four times per year in grades 3–8, benchmark assessments report on students' facility with each of the grade-level appropriate disciplinary core ideas, science and engineering practices, cross-cutting concepts, and performance expectations of the NGSS.

Evidence

- **Environments and Survival** unit (grade 3): This unit, like all others in grades 3–5, begins with a pre-unit writing task that offers insight into students' initial understanding of the unit's core content and offers a baseline from which to measure growth over the course of the unit. Each unit also features an end-of-unit writing task, which, for this unit, is a culminating written explanation of why the snails with yellow shells were more likely to survive in their environment ten years ago. Students also apply these ideas in a design challenge in the final chapter, which provides an opportunity to assess students' developing facility with the practice of designing solutions and their application of the crosscutting concept of Structure and Function. Along the way, a range of assessment opportunities are embedded in instruction. These include Critical Juncture Assessments designed to assess students' understanding at key moments in each chapter (for example, in Lessons 1.4, 2.6 and 3.3), and frequent On-the-Fly Assessments (such as the ones employed in Lessons 2.7 and 4.3) that were designed to guide teachers as they monitor students' learning progress on a lesson-by-lesson basis. Each Critical Juncture and On-the-Fly Assessment features specific guidance on how to make instructional use of the information gathered through the assessment opportunity. Together, the assessments are a coherent system through which teachers gain actionable, timely, and relevant insight into their students' learning.

Finding additional evidence:

Unit level, refer to:

- 1 **Assessment System.** Open any unit. Click "JUMP DOWN TO UNIT GUIDE" link, then click "Assessment System."
- 2 **Embedded Formative Assessments.** Open any unit. Click "JUMP DOWN TO UNIT GUIDE" link, then click "Embedded Formative Assessments."

F Opportunity to learn

Provides multiple opportunities for students to demonstrate performance of practices connected with their understanding of disciplinary core ideas and crosscutting concepts and receive feedback.

Each unit also includes a range of assessments embedded in instruction. By leveraging the formative opportunities in the learning experiences that students are already engaged in, these assessments are designed to provide regular information to the teacher with minimal impact on instructional time. These embedded assessment opportunities are smaller in scale than the more formal assessments described above and often highlight individual concepts or practices. *On-the-Fly Assessments* (OtFAs) are designed to help a teacher make sense of student activity during a learning experience (e.g., student–student talk, writing, model construction) and provide evidence of how a student is coming to understand core concepts. Each OtFA provides a description of how a student might demonstrate understanding of a concept and/or practice through the activity (and, where appropriate, what evidence of common alternative conceptions would entail). Importantly, OtFAs also provide instructional suggestions for what to do in response to the assessment information, and, where possible, highlight existing resources and opportunities within the unit for additional practice with the relevant ideas.

Another set of tools to help illuminate student thinking and to support student metacognition are *Self-Assessments*. At the end of each chapter, students are given an opportunity to reflect on the unit's central problem by responding to the same set of prompts each time. The purpose of this consistency is to ensure that students' own progress is more visible to them. Reviewing students' responses provides a sense of what students believe about what they know. Looking at students' questions about what they are still wondering can also provide insight into what they are curious about or interested in learning, or what they might need additional support to learn.

Evidence

- **Vision and Light** unit (grade 4): In Lesson 2.1, students use the digital simulation to investigate the role that light plays in an animal's ability to get information from its environment, demonstrating their understanding of controlling variables as a science practice, as well as the crosscutting concept of cause and effect, as they do. In Lesson 3.2, they get another opportunity to demonstrate their understanding of both by engaging in a class discussion about the book *Crow Scientist*, which profiles prominent wildlife biologist John Marzluff and focuses on his investigation of the American crow's ability to recognize individual human faces. Both activities include On-the-Fly Assessment information that provides teachers guidance on what they should look for in student performance.
- **Balancing Forces** unit (grade 3): In Lesson 2.4, students demonstrate their understanding of touching forces and evidence of forces, magnetic force, and gravity, by using the Diagramming Tool to model several forces. They get another opportunity to demonstrate understanding in a different modality in Lesson 2.5, when students apply their knowledge of forces to write explanations about two demonstrations that involve gravity and magnetic force.
- **The Earth System** unit (grade 5): Embedded On-the-Fly assessments can be seen in Lesson 2.3, when partners work together to create a digital model that shows what happens at the nanoscale when water vapor condenses and raindrops form, and in Lesson 2.4, when students discuss their water vapor observations and make predictions about the results of the Freshwater and Saltwater Drops Investigation. These are just two of the many opportunities students have to show their developing understanding of the unit's core concepts and facility with focal science and engineering practices.

Finding additional evidence:

Unit level, refer to:

- 1 **Embedded Formative Assessments.** Open any unit. Click "JUMP DOWN TO UNIT GUIDE" link, then click "Embedded Formative Assessments."

Lesson level, refer to:

- 1 Students are provided with self-assessment opportunities at the end of each chapter. See the "Check Your Understanding" student sheets for each chapter in every unit's Student Investigation Notebook.

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

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