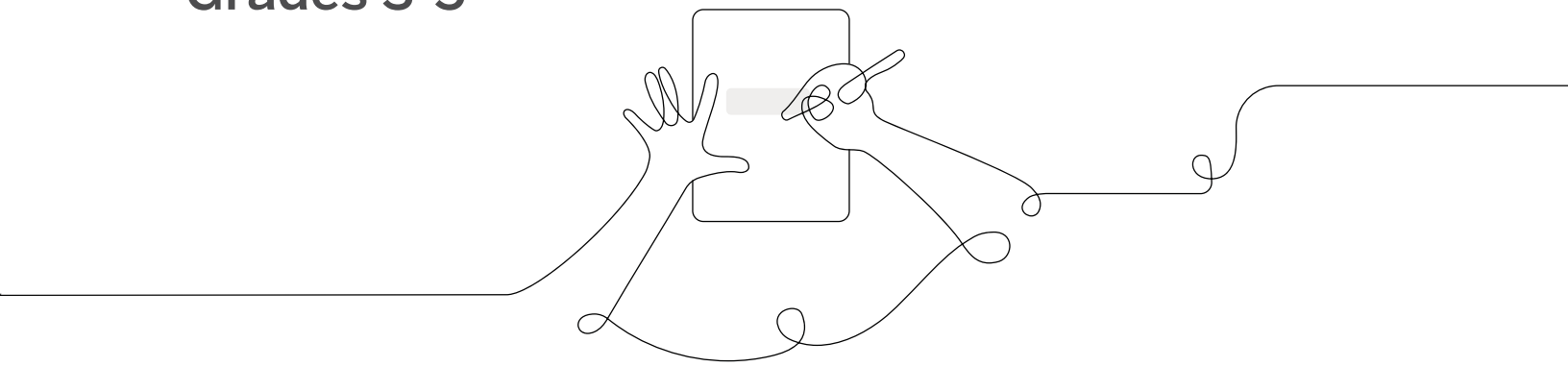
AmplifyScience

Participant Notebook

Exploring the Amplify Science Curriculum

Grades 3-5



Amplify Science Professional Learning Workshop

Title: Exploring the Amplify Science K-5 Curriculum

Audience: NYC elementary school teachers new to Amplify Science

Workshop series: Three, 3-hour sessions

Description: In this professional learning workshop, participants will become familiar with the Amplify Science curriculum and explore how the units in Amplify Science support three-dimensional learning. We will unpack a unit and show how to enact practices that promote Culturally Responsive-Sustaining Education (CR-SE). This session is intended for teachers new to the Amplify Science program.

Part 1

- **Framing the day**
  - Welcome
- **The Amplify Approach**
  - Multimodal learning
- **Model Lesson Experience**
  - SEL suggestions
  - Lesson reflection
- **Closing**
  - Final Questions & Feedback

Part 2

- **Framing the day**
  - Welcome
- **Unit Exploration**
  - Unpacking the Progress Build
- **Unit Coherence**
  - Unpacking unit coherence in your first unit
- **Planning for CR-SE**
  - Unpacking - Eliciting and Leveraging Students' Prior Knowledge
- **Closing**
  - Final Questions & Feedback

Part 3

- **Framing the day**
  - Welcome
- **The Amplify Science Assessment System**
  - Formative assessment data tracking
- **Collaborative Planning**
  - Planning time
  - Share out
- **Closing**
  - Final Questions & Feedback

Year at a glance

Units per year

K–2 **3**

3–5 **4**

Unit types

Although every Amplify Science unit provides a three-dimensional learning experience, each unit emphasizes one of the following specific science and engineering practices.

Investigation

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

Modeling

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

Engineering design

Engineering design solves complex problems by applying science principles to the design of functional solutions, and iteratively testing those solutions to determine how well they meet pre-set criteria. All Amplify Science engineering design units are structured to make the development of such solutions the central focus.

Argumentation (grades 3–5)

These Amplify Science units provide extra support to students engaging in the practice of argumentation. As students move up the K–5 grades, they focus on important aspects of argumentation in an intentional sequence.

Course structure

Key

- (A) Argumentation
- (E) Engineering design
- (I) Investigation
- (M) Modeling

Kindergarten (66 lessons)

- *Needs of Plants and Animals* **22 lessons** (I)
- *Pushes and Pulls* **22 lessons** (E)
- *Sunlight and Weather* **22 lessons** (M)

Grade 1 (66 lessons)

- *Animal and Plant Defenses* **22 lessons** (M)
- *Light and Sound* **22 lessons** (E)
- *Spinning Earth* **22 lessons** (I)

Grade 2 (66 lessons)

- *Plant and Animal Relationships* **22 lessons** (I)
- *Properties of Materials* **22 lessons** (E)
- *Changing Landforms* **22 lessons** (M)

Grade 3 (88 lessons)

- *Balancing Forces* **22 lessons** (M)
- *Inheritance and Traits* **22 lessons** (I)
- *Environments and Survival* **22 lessons** (E)
- *Weather and Climate* **22 lessons** (A)

Grade 4 (88 lessons)

- *Energy Conversions* **22 lessons** (E)
- *Vision and Light* **22 lessons** (I)
- *Earth's Features* **22 lessons** (A)
- *Waves, Energy, and Information* **22 lessons** (M)

Grade 5 (92 lessons)

- *Patterns of Earth and Sky* **22 lessons** (I)
- *Modeling Matter* **22 lessons** (M)
- *The Earth System* **26 lessons** (E)
- *Ecosystem Restoration* **22 lessons** (A)

K-5 Program components

The K-5 program contains both physical and digital instructional materials. The table below describes materials and, when applicable, includes links to find additional information.

Teacher materials	
Teacher's Guide bit.ly/amplifyk5navigation	The digital Teacher's Guide contains all of the unit's lesson plans, differentiation strategies, and an assortment of instructional supports and resources at the unit, lesson, and individual activity level. All unit Teacher's Guides are also available as PDFs, which can be generated automatically through the curriculum website by pressing the "Generate Printable Teacher's Guide" button. Print Teacher's Guides are available for purchase.
Classroom Slides bit.ly/amplifyslideshowto	To make planning and delivering Amplify Science K–5 lessons faster and easier, each lesson has a downloadable and editable PowerPoint file or Google Slides file to help guide teachers and their students through the lesson with clearly sequenced, engaging, and easy-to-follow images, videos, questions, and instructions.
Classroom Wall materials	The printed Classroom Wall materials can be found in the unit kit. PDFs are also provided in the digital Teacher's Guide to allow quick replacement if needed. Posting questions and vocabulary on the wall throughout the unit is a valuable way to focus students' attention on the most important content of the lessons.
Embedded assessments bit.ly/amplifyk5assessment	Amplify Science assessments include formal and informal opportunities for students to demonstrate understanding and for teachers to gather information, while allowing teachers the flexibility to decide what to score and what simply to review. The Assessment System for each unit is designed to provide teachers with credible, actionable, and timely diagnostic information about student progress toward the unit's learning goals and their mastery of the grade-level disciplinary core ideas, science and engineering practices, and crosscutting concepts.
Program Guide	Accessible from the Global Navigation menu, the Program Guide details information about the program, including its authorship, development, themes, and more. It serves as a resource for finding out more about the program's structure, components, supports, how it meets standards, and flexibility.
Program Hub bit.ly/amplifyprogramhub	Accessible from the Global Navigation menu, the Program Hub features remote learning resources, training videos, and hands-on investigation videos.

K-5 Program components cont.

Student materials	
Hands-on materials bit.ly/amplifymaterials	The unit kit includes the physical materials used for the hands-on activities that are carried out at strategic points throughout the unit. There are two types of physical manipulatives: non-consumables and consumables. Non-consumables are durable and, if cared for properly, can be used over the course of several years (e.g. magnets, stopwatches). Consumables are used up with each use and must be replenished.
Investigation Notebooks bit.ly/amplifyk5fillable	The Investigation Notebook contains instructions for student activities and space for students to record data, reflect on ideas from texts and investigations, and construct explanations and arguments. Each unit kit includes one print copy of the Investigation Notebook. Teachers can download a PDF of the Investigation Notebook on the Teacher's Guide to print for their students. These PDFs are fillable, so students can also complete their work digitally.
Student books	Every unit includes 5 unique informational texts written for the unit. Kits come with a class set (18 copies) of each title. Kits for K-1 units also include a copy of each book in an oversized “Big Book,” enabling teachers to read aloud to their young students. Informational texts encourage students to read purposefully, look for evidence to support their claim, and ask questions as they read.
Digital applications bit.ly/amplifydigitaltools	**Grades 2-3:** The digital tools used at these grade levels help students with modeling, graphing, and sorting information. **Grades 4-5**: Digital tools and Simulations (Sims) at these grade levels are slightly more complex and serve as venues of exploration and a means for collecting data and evidence, while also presenting students with opportunities to make observations and manipulate variables of key scientific processes and mechanisms.
Curriculum add-ons	
Spanish-language materials bit.ly/amplifyspanish	Spanish licenses give teachers digital access to the following materials in Spanish: Classroom Slides, lesson projections, downloadable PDFs of print materials (including Classroom Wall materials, Investigation Notebooks, assessments), and recommended in-class “teacher talk” guidance. Available for purchase.
Classroom Library license	The Classroom Library license is an add-on to the teacher license, and it enables students to access the digital copies of the unit’s student books via the Student Apps page. Available for purchase.
Benchmark assessments* bit.ly/amplifyngssbenchmarks	The Amplify NGSS Benchmark Assessments are designed to help teachers measure grade 3-5 student progress toward the three dimensions and performance expectations of the Next Generation Science Standards.

*To ensure the assessments measure progress towards Performance expectations and not the progress within the program itself, the NGSS Benchmark Assessments were developed by Amplify outside of development efforts involving the Lawrence Hall of Science and Amplify Science.

Unit Map

Why does Ergstown keep having blackouts?

Students take on the role of systems engineers for Ergstown, a fictional town that experiences frequent blackouts, and explore the reasons why an electrical system can fail. Students apply what they learn to choosing new energy sources and energy converters for the town, and then they prepare arguments for why their design choices will make the town's electrical system more reliable.

Chapter 1: What happened to the electrical system the night of the Ergstown blackout?

Students figure out: The devices stopped working in Ergstown because they weren't able to get electrical energy from the electrical system. To convert energy to light, heat, motion, or sound, devices need to be plugged into the wall and receive electrical energy. During the blackout, the devices weren't getting this electrical energy.

How they figure it out: Students investigate several different systems, including a simple circuit powered by a solar cell. They review evidence from the blackout and make an argument about what they think caused the blackout.

Chapter 2: What makes the devices in Ergstown output energy or fail to output energy?

Students figure out: Energy isn't created or destroyed. Devices can convert electrical energy to light, heat, motion, or sound when they get electrical energy because these are all forms of energy. When all the devices were running, they caused a blackout. The devices needed more energy from the electrical system than was available. Either the town was using too many devices, or the devices were not energy efficient. If more energy is needed from the electrical system than is available, a blackout can occur.

How they figure it out: Using the *Energy Conversions* Simulation, students explore different ways to convert energy from one form to another. They consider the relationship between the amount of energy used and the amount of energy in the electrical system. Finally, students write their first argument for how to solve the problem of blackouts in Ergstown.

Chapter 3: Where does the electrical energy for the devices in Ergstown come from?

Students figure out: Electrical energy that comes through the electrical grid must have a source and a source converter. There are many possible sources, such as fossil fuels, wind, water, and sunlight. Each source has a converter that changes the energy form of the source to electrical energy. Energy use in Ergstown could have caused a blackout if there wasn't enough energy coming from the source, there weren't enough source converters to convert energy from the source, or the source converters were broken.

How they figure it out: By investigating why the hospital did not lose power, students discover a variety of energy sources that provide power to Ergstown. They read about solar devices and design and build a wind converter that can power an electrical device. They weigh the strengths and weaknesses of two possible solutions to the problem.

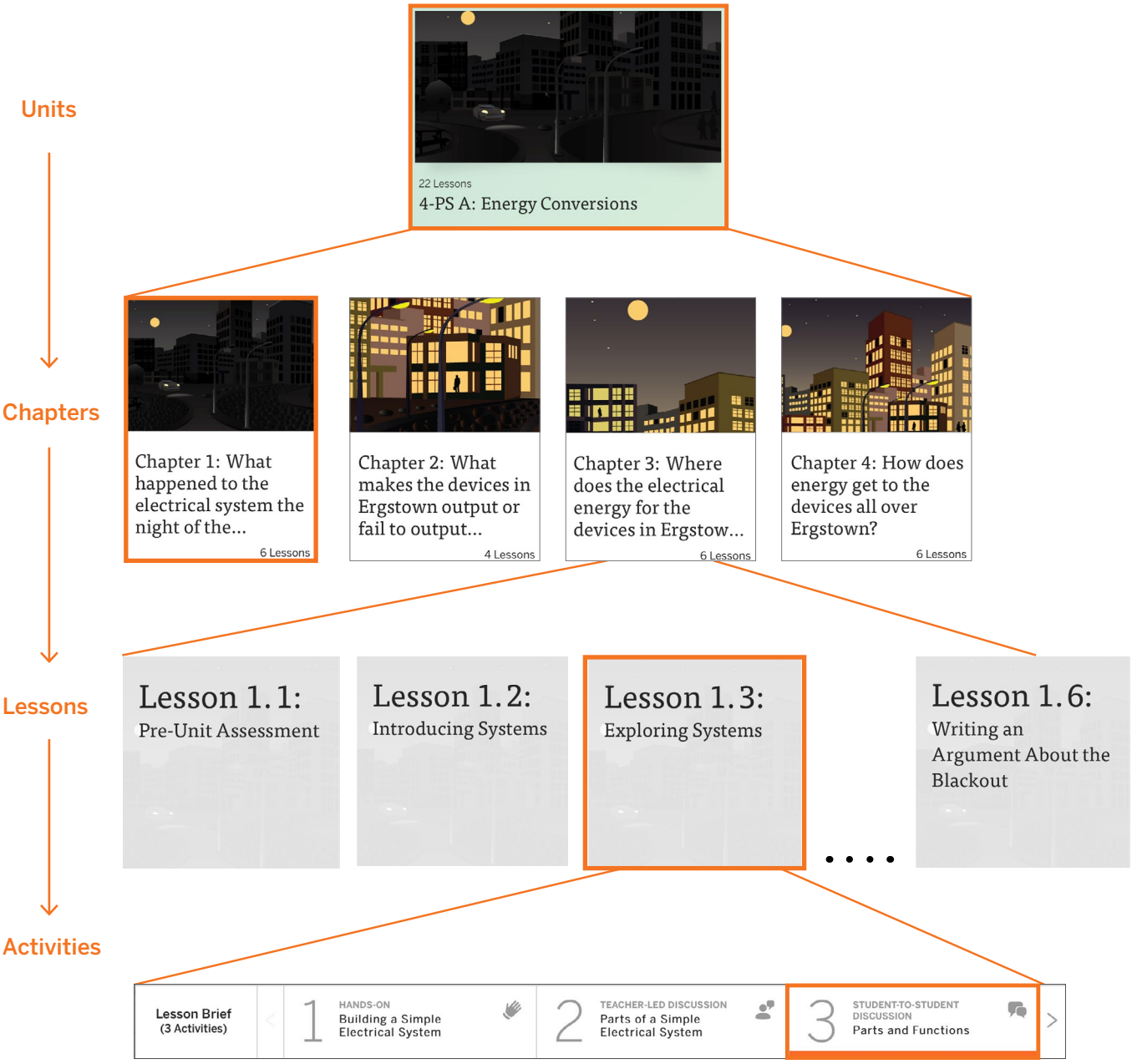
Chapter 4: How does energy get to the devices all over Ergstown?

Students figure out: The energy that comes from the source is transferred through the electrical grid. The devices won't function if the wires that connect the source converter and the devices are broken. This can happen if the connections between the grid and the converters aren't strong enough, if the wires aren't in a secure location, or if there aren't enough backup wires.

How they figure it out: Students review evidence from Ergstown and analyze the efficiency of various converters. They assess different improvements to the electrical system and design and present two possible "best" solutions.

Amplify Science unit structure

Each unit in the Amplify Science elementary curriculum is structured as a series of chapters. Each chapter contains lessons, and each lesson contains activities.



Classroom Slides reference

Classroom Slides are a resource designed to make planning and teaching with Amplify Science faster and easier. Each lesson has editable slides optimized for **Microsoft PowerPoint Version 16 and Google** to help guide teachers and their students through the lesson with easy-to-follow images, videos, questions, and instructions.

This reference sheet has basic information to get you started. For a more in-depth how-to? Go to: https://tinyurl.com/amplifyslideshowto

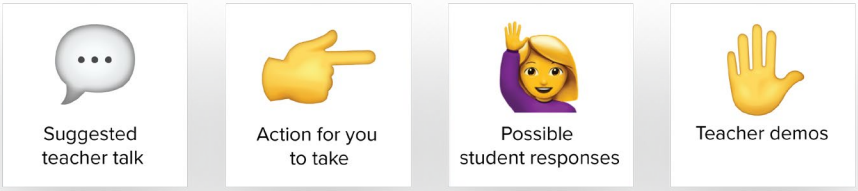
Helpful tips:

The text on the slides is color coded! Black text on the slides denotes suggested teacher talk. Orange text on the slides denotes a student action.

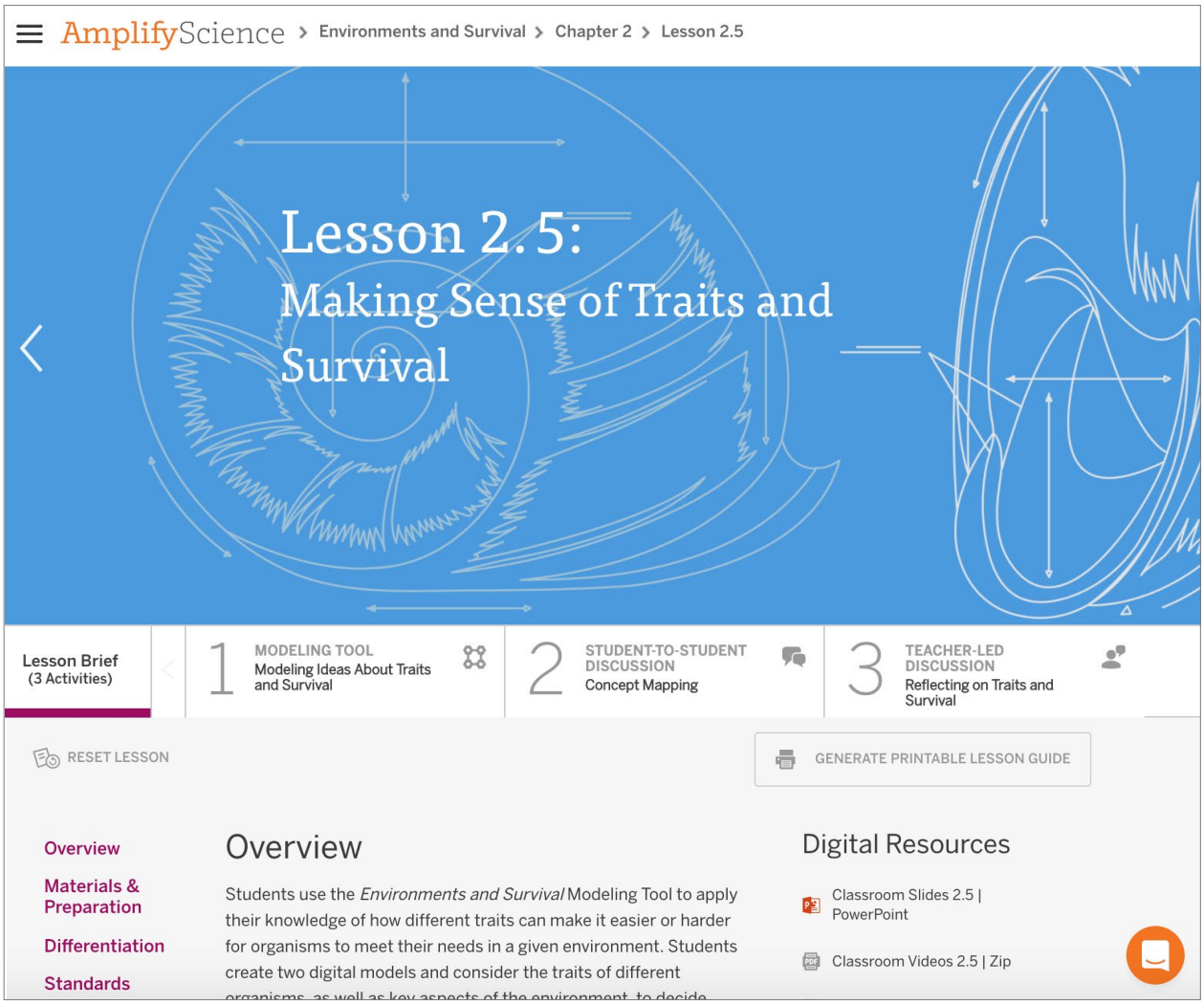
Icons on the slide cue the teacher about what is happening in the lesson. Here's what the icons on the slides mean:

You may occasionally also come across the following student action icons:

In addition to the text and visuals on the slide, each slide's notes field contains additional information, including possible student responses, follow-up prompts, and instructional steps. In most cases, the content on the slide is meant to come before the actions and suggested teacher talk written in the notes. Here's what the icons in the notes field mean:

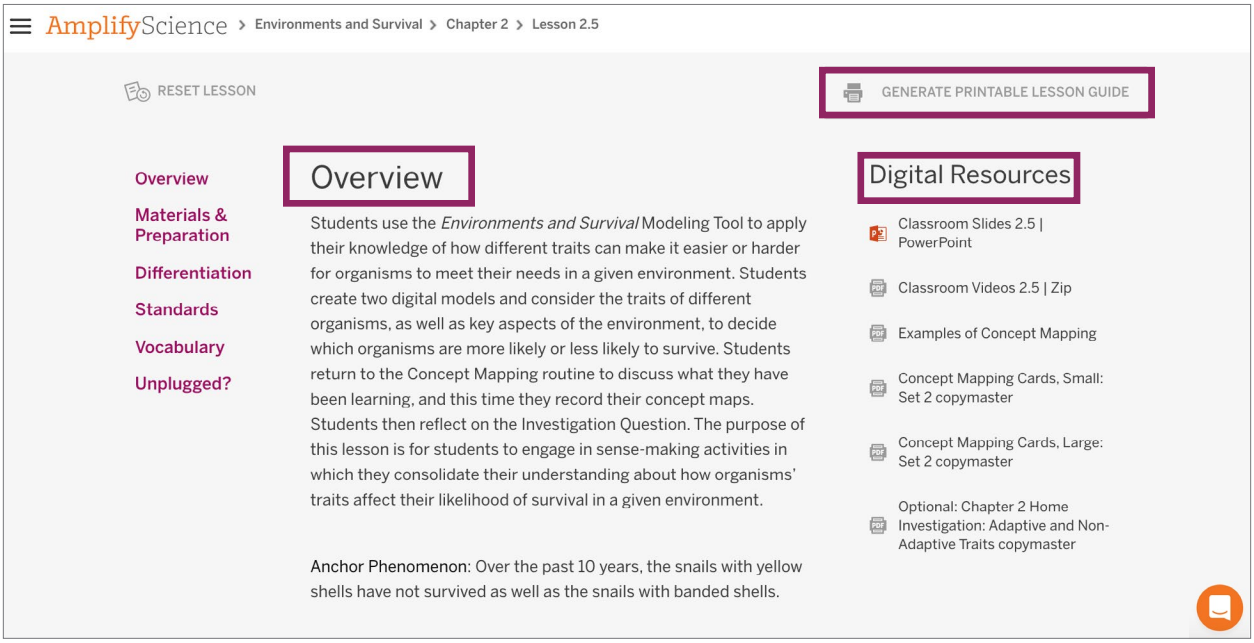


Navigation within a lesson

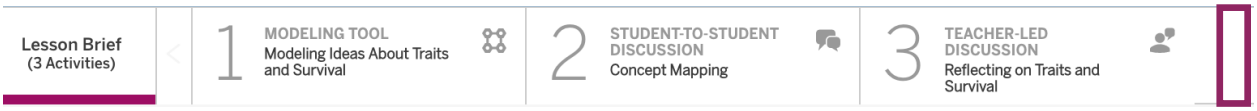


1. The lesson's landing page is referred to as the **Lesson Brief**. Above is an example from a lesson in the grade 3 Environments and Survival unit. The Lesson Brief provides valuable information to support teachers, including an overview of the content that will be covered in the lesson.

Navigation within a lesson (cont.)

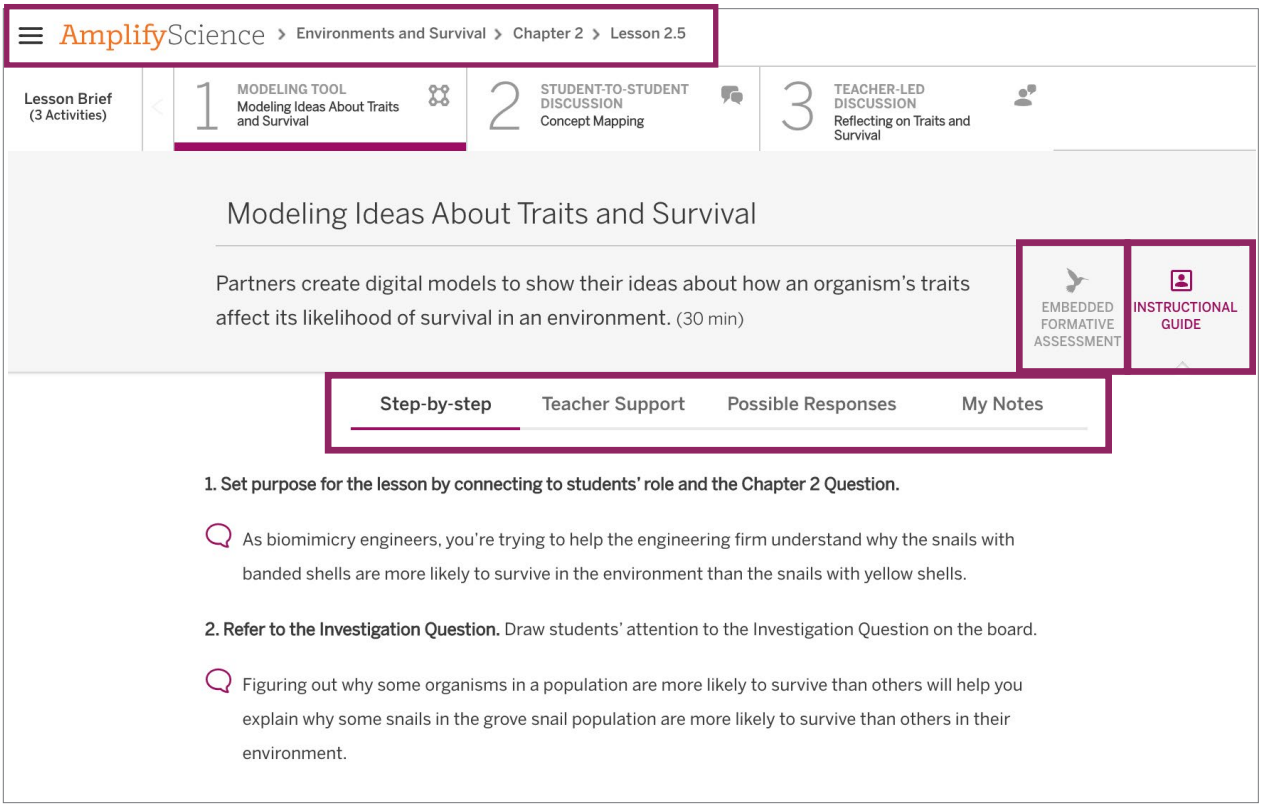


2. Navigate between each section on the page by either scrolling or clicking the index in the left column. You can always return to the top by clicking on the "Back to Top" button in the bottom left corner.
   - The **Overview** includes a summary of the lesson, describes what students will learn, and provides activity summaries and timing.
   - **Materials and Preparation** provides a list of materials for the lesson, and how to prepare for teaching.
   - **Differentiation** describes supports and strategies for differentiation.
   - **Standards** details which standards the lesson is aligned to.
   - **Vocabulary** lists focal vocabulary emphasized in the lesson.
   - **Unplugged** lists recommendations for working offline.
3. Select **GENERATE PRINTABLE LESSON GUIDE** to access a downloadable PDF that includes all of the content in digital format, including teacher supports, possible responses, and assessments.
4. **Digital Resources** provide all of the resources for a lesson, which may include Classroom Slides, projections, copymasters, videos, and reference illustrations for teacher reference. Each resource can be downloaded before each lesson.



5. The **Lesson Map**, shown above, displays the sequence of the activity titles which, once selected, access each activity's instructional guide. An arrow > at the right end of the lesson map lets you know that there are more activities in a lesson than what's shown.
6. **Activity titles** in the Lesson Map are numbered to help teachers navigate through the lesson.

Navigation within a lesson (cont.)



7. Once in an activity, you will see the **INSTRUCTIONAL GUIDE**, within which are the following tabs:

   STEP-BY-STEP lists all of the steps for teaching the activity. This will be open by default when you first navigate to the activity.

   - **Bold lead-ins** summarize what happens in each instructional step.
   - Purple speech bubbles indicate **teacher talk**, suggestions for what you should say as you teach.
   - Text in brackets [ ] indicates an expected student response.

   TEACHER SUPPORT provides suggestions, rationale, and background information.

   POSSIBLE RESPONSES indicate possible student responses for independent or small group activities.

   MY NOTES provides a space to record thoughts and observations about each activity.

   Note: If there are no Teacher Support notes for the activity, the Teacher Support tab will not appear. Likewise, if there are no possible responses for the activity, the Possible Responses tab will not appear.

8. The **grey hummingbird** indicates there is an **embedded formative assessment** in this activity. Click on the hummingbird to view the assessment (the icon turns orange to indicate selection).

9. The **breadcrumb trail** (Unit-Chapter-Lesson) (top left) can be used to navigate to different parts of the unit.

SOCIAL EMOTIONAL LEARNING'S FIVE CORE COMPETENCIES

There are many frameworks and ways to talk about social emotional competence and skills. For simplicity and clarity, this document uses a set of five competencies identified by the Collaborative for Academic, Social, and Emotional Learning (CASEL) that all young people and adults need to learn to be successful in school and in life. This framework has been widely accepted across the country. New York State has endorsed these five core competencies.

Figure 1: Framework for Systemic Social and Emotional Learning. ©CASEL 2017

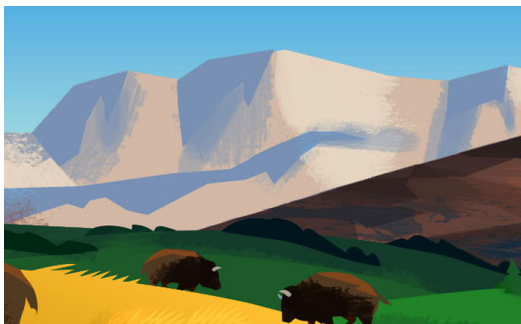
Five Core Social Emotional Competencies

Competency	Description
Self-Awareness	Competence in the self-awareness domain involves understanding one's emotions, personal goals, and values. This includes accurately assessing one's strengths and limitations, having a positive mindset, and possessing a well-grounded sense of self-efficacy and optimism. High levels of self-awareness require the ability to recognize how thoughts, feelings, and actions are interconnected.
Self-Management	Competence in the self-management domain requires skills and attitudes that facilitate the ability to regulate emotions and behaviors. This includes skills necessary to achieve goals, such as the ability to delay gratification, manage stress, control impulses, and persevere through challenges.
Social Awareness	Competence in the social awareness domain involves the ability to take the perspective of and have respect for those with different backgrounds or cultures, and to empathize and feel compassion. It also involves understanding social norms for behavior and recognizing family, school and community resources and supports.
Relationship Skills	Competence in this domain involves communicating clearly, listening actively, cooperating, resisting inappropriate social pressure, negotiating conflict constructively, and seeking help when needed. Relationship skills provide individuals with the tools they need to establish and maintain healthy and rewarding relationships, and to act in accordance with social norms.
Responsible Decision-Making	Competence in this domain requires the ability to consider ethical standards, safety concerns, and make accurate behavioral assessments to make realistic evaluations of the consequences of various actions, and to take the health and well-being of self and others into consideration. Responsible decision-making requires the knowledge, skills, and attitudes needed to make constructive choices about personal behavior and social interactions across diverse settings.

Derived from NYS Education Department's "Social Emotional Learning: A Guide to System Whole-School Implementation" March 2019

Amplify Science

Social and Emotional Learning in Amplify Science



Social and emotional learning (SEL) as defined by the Collaborative for Academic, Social, and Emotional Learning (CASEL) is "the process through which children and adults understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions". CASEL has identified five core competencies that support social emotional learning. Below we describe examples of how each competency is supported in Amplify Science.

1 Self-awareness

Students in Amplify Science have opportunities to build their self-awareness as they **identify personal, cultural, and linguistic assets**. For example, when the anchor phenomenon and question of each unit is introduced, students are asked to consider and share their initial ideas. In elementary units, a routine and an **overview document** guide teachers to draw out and record students' prior knowledge (including culturally specific knowledge) in these moments. Students are also asked to make connections to their prior knowledge and personal experiences as they preview and read books and articles. In the Differentiation section of the Lesson Brief, Specific Differentiation Strategies for English Learners include suggestions in some lessons to leverage students' native languages. In addition, the Pre-Unit Assessment Guide provided with each unit helps teachers identify and build on relevant prior knowledge students demonstrate in this formative assessment.

Students also have opportunities to build their self-awareness as they develop their interests and a sense of purpose. The anchor phenomenon and question for each unit are designed to help students experience a wide range of the purposes that science can serve, such as answering an intrinsically mysterious question (for example, what caused a liquid lake on a moon of Saturn to disappear?), understanding a problem affecting people (for example, a water shortage in a town) or animals (for example, fewer geckos surviving in a changed environment), or designing a solution for people in crisis (for example, designing nutritional bars for injured patients or rescue workers after a natural disaster). Engaging with these real and diverse contexts in which science is useful can be an opportunity for students to develop their own interests related to science and decide which purposes they most connect with. The books and articles in the program augment this range of contexts and purposes of science. Many also feature real scientists—with intentional diversity in terms of race, ethnicity, gender, age, ability, and sexuality—which may serve as role models for students.

2 Self-management

Students in Amplify Science have opportunities to develop their self-management as they **set personal and collective goals**. The self-assessments provided at the end of each chapter are an opportunity for students to reflect on what they have learned and what they still want to know more about. In middle school Engineering Internships, and in elementary units that highlight the practice of designing solutions, groups of students engage in setting design goals as they develop and improve their designed solutions. In some elementary units, students are taught the strategy of setting a purpose for reading and for investigating. To further highlight this aspect of Competency 2, teachers can guide students to set learning goals at the beginning of each unit, and return regularly to reflect on those goals.

Students also have opportunities to develop their self-management as they **demonstrate personal and collective agency**. Students have many opportunities to make meaningful choices. For example, middle school students decide on their own connections and questions to annotate (on their own) and discuss (in pairs) during Active Reading, they decide which evidence to use and how and which claim to support during Science Seminars, and they decide on goals and design strategies with their team during Engineering Internships. Elementary students decide on design strategies in engineering-focused units, and plan their own investigations in the final chapter of many investigation-focused units. As students work to explain the anchor phenomenon of each unit, they demonstrate agency as they develop their own explanations and try to come to agreement on an explanation as a class.

3 Social awareness

Students in Amplify Science have opportunities to develop their social awareness as they **recognize family, school, and community resources and supports**. Every middle school unit includes Home Investigations and every elementary unit has Family Homework Experiences in which students discuss what they are learning with family members and/or work with family members to investigate related phenomena around their home or neighborhood. Each elementary unit also includes a Family Connections Letter or Family Connections Homework in which students find out what experiences, ideas, and skills family members have related to the unit. Teachers invite students to share what they learned from their families during a class discussion of prior knowledge and experiences related to the unit.

Students also have opportunities to develop their social awareness as they take **others' perspectives**. Student-to student discussion is a key component of lessons throughout the program, and students are taught to listen carefully to their peers, and remain open to changing their minds based on evidence.

4 Relationship skills

Students in Amplify Science have opportunities to develop their relationship skills as they work to **communicate effectively**. Student-to student discussion is a key component of lessons throughout the program, and students are taught to listen carefully to their peers, share evidence for their ideas, and help involve their peers in discussions. Discourse routines, such as Think-Pair-Share, Shared Listening, and Science Seminars structure and support pair and small group discussions. During whole-class discussions, teachers are encouraged to invite students to agree or disagree with one another and use evidence to explain why. Discussion norms and sentence starters help support students in communicating clearly. Students also write explanations and arguments to communicate their ideas, with the idea of writing for an audience emphasized and modeled. To further highlight this aspect of Competency 4, teachers can work with the class to generate a set of discussion norms early in the year and help students reflect on how well the class is meeting those norms throughout the year.

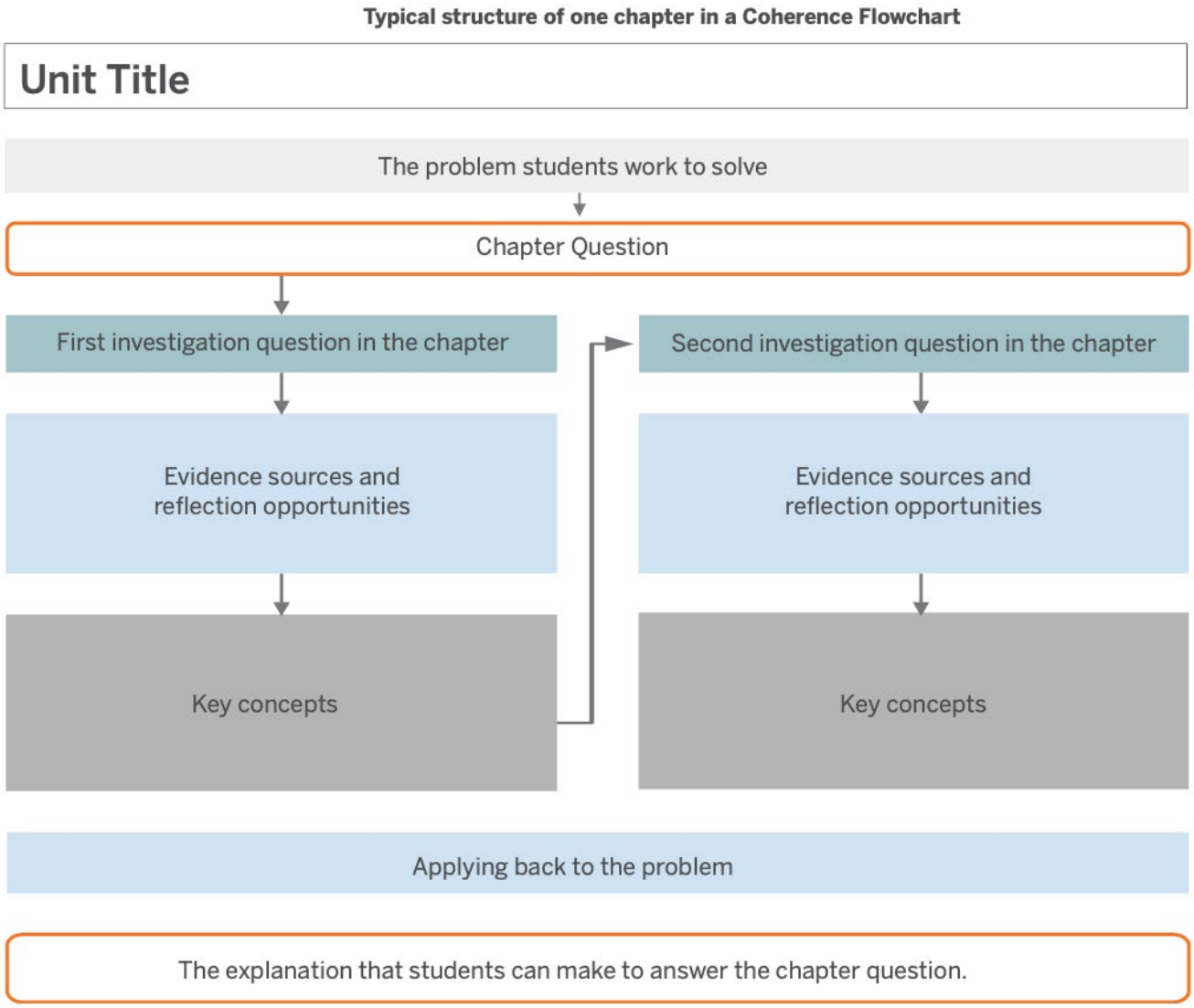
Students also have opportunities to develop their relationship skills as they **practice teamwork and collaborative problem-solving**. Students work in pairs and groups throughout the program, for example as they investigate using physical models or digital simulations, during structured pair and group discussions, in group reflection routines such as Word Relationships and Write and Share. In addition, over the course of each unit, the class collaborates to solve the central problem of the unit, gathering and making sense of evidence and discussing and writing to arrive at conclusions. To further highlight this aspect of Competency 4, teachers can have students reflect on how well their group worked together and identify strengths and areas for growth at the conclusion of significant instances of group work.

5 Responsible decision-making

Students in Amplify Science have opportunities to develop their responsible decision-making skills as they **identify solutions for personal and social problems**. In many units, the central question or engineering challenge involves solving a social problem. Students work to solve problems including monarch butterflies disappearing from a school garden, a playground being too hot or too cold, frequent blackouts in a city, a town's water shortage, climate change, the need for tsunami warning systems, and elevated risk for skin cancer in certain parts of the world. There are also opportunities for students to decide on their own problems they want to address, for example in Day 10 of each Engineering Internship. To further highlight this aspect of Competency 5, teachers can have students regularly reflect on what problems in their own lives or communities could be addressed using the concepts or practices students are learning.

Students also have opportunities to develop their responsible decision-making skills as they **learn to make a reasoned judgment after analyzing information, data, and facts**. This is central to the practice of making arguments from evidence, which is a key part of every unit. Beginning in kindergarten, students learn what evidence is and how it can be used to answer questions, and they have multiple opportunities to gather evidence. Over the course of the grades, students engage with this practice with more complexity, including using evidence to decide between multiple possible claims, using reasoning to make connections between evidence and claims, evaluating the quality of evidence, and using evidence to refute possible claims. Students are supported to communicate their arguments in writing and orally through explicit teaching and guidelines, teacher modeling, models of arguments in books and articles, sentence starters, and more. To further highlight this aspect of Competency 5, teachers can have students reflect on ways this practice can be useful outside the contexts of science and engineering.

Coherence Flowchart structure



Instruction is framed by questions about the unit's anchor phenomenon and the related problem students are solving. Chapter Questions then guide students in figuring out the phenomenon, piece by piece. Within each chapter, Investigation Questions focus students on a manageable piece of content that will help them figure out the Chapter Question. Each question motivates activities, and each activity provides specific evidence related to the Investigation Question. Students synthesize the understanding constructed over multiple activities, and this understanding is formalized through key concepts. Often a key concept leads students to an additional Investigation Question students need to pursue to answer the Chapter Question. At the end of the chapter, students' new understanding is applied back to the unit's anchor phenomenon and leads students to a new Chapter Question or a final explanation.

Energy Conversions: Blackout in Ergstown

Unit Anchor Phenomenon
Problem students work to solve

Ergstown has frequent blackouts.
Why does Ergstown keep having blackouts?

Chapter-level Anchor Phenomenon
Chapter 1 Question

There was a blackout in Ergstown.
What happened to the electrical system the night of the Ergstown blackout?

Investigative Phenomena
Investigation Questions

Cities have electrical systems.
What is a system? (1.2, 1.3)

Cities have electrical systems.
What can electrical energy in a system be used for? (1.4, 1.5)

Evidence sources and reflection opportunities

- Observe a simple system (1.2)
- Read *Systems* (1.2)
- Build a simple electrical system (1.3)
- Discuss parts and functions of a system (1.3)

- Find electrical energy in the Sim (1.4)
- Build simple electrical systems and observe various types of energy outputs (1.5)
- Read about forms of energy in *It's All Energy* (1.5)
- Write about ideas from the reading and hands-on investigation (1.5)

Key concepts

- A system is a collection of interacting parts that work together. Each part in the system plays a role to perform an overall system function. (1.3)

- Light, motion, sound, and thermal energy are all forms of energy. You can observe evidence of these different forms as outputs of electrical devices. (1.5)

Application of key concepts to the problem

- Observe and write about forms of energy in the Ergstown subway (1.6)

Explanation that students can make to answer the Chapter 1 Question

The devices stopped working in Ergstown because they weren't able to get electrical energy from the electrical system. When devices work, they output light, heat, motion, or sound. These are forms of energy. During the blackout, the devices weren't getting electrical energy.

Unit Guide resources

Once a unit is selected, select **JUMP DOWN TO UNIT GUIDE** in order to access all unit-level resources in an Amplify Science unit.

Planning for the unit

Unit Overview	Describes what's in each unit, the rationale, and how students learn across chapters
Unit Map	Provides an overview of what students figure out in each chapter, and how they figure it out
Progress Build	Explains the learning progression of ideas students figure out in the unit
Getting Ready to Teach	Provides tips for effectively preparing to teach and teaching the unit in your classroom
Materials and Preparation	Lists materials included in the unit's kit, items to be provided by the teacher, and briefly outlines preparation requirements for each lesson
Science Background	Adult-level primer on the science content students figure out in the unit
Standards at a Glance	Lists NGSS (Performance Expectations, Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts) and CCSS (English Language Arts and Mathematics).

Teacher references

Lesson Overview Compilation	Lesson Overview of each lesson in the unit, including lesson summary, activity purposes, and timing
Standards and Goals	Lists NGSS and CCSS in the unit, explains how the standards are reached
3-D Statements	Describes 3-D learning across the unit, chapters, and in individual lessons
Assessment System	Describes components of the Amplify Science assessment system, identifies each 3-D assessment opportunity in the unit
Embedded Formative Assessments	Includes full text of formative assessments in the unit
Books in This Unit	K-5: Summarizes each unit text and explains how the text supports instruction
Articles in This Unit	6-8: Summarizes each unit text and explains how the text supports instruction
Apps in This Unit	2-8: Outlines functionality of digital tools and how students use them
Flextensions in This Unit	Summarizes information about the Hands-On Flextension lesson(s) in the unit

Unit Guide resources cont.

Printable resources	
3-D Assessment Objectives	K-5: Identifies where each dimension of the target Performance Expectations are assessed in the unit, in the grade, or in the grade-band
Article Compilation	6-8: Compilation of all the articles in the unit for the teacher to print and copy throughout the unit
Coherence Flowcharts	Visual representation of the storyline of the unit
Copymaster Compilation	Compilation of all copymasters for the teacher to print and copy throughout the unit
Flextension Compilation	Compilation of all copymasters for Hands-on Flextension lessons throughout the unit
Investigation Notebook	Digital version of the Investigation Notebook, for copying and projecting. The PDFs are fillable, so students can also complete their work digitally.
Multi-Language Glossary	Glossary of unit vocabulary in multiple languages
NGSS Information for Parents and Guardians	Information for parents about the NGSS and the shifts for teaching and learning
Print Materials (8.5" x 11")	Digital compilation of printed cards (i.e. vocabulary cards, student card sets) provided in the kit
Print Materials (11" x 17")	Digital compilation of printed Chapter Questions and Key Concepts provided in the kit

Amplify Science @Home resources reference

Use this guide to keep track of the different resources available for remote and hybrid learning.

Instructional materials

Click Remote and hybrid learning resources, then select your grade level from the dropdown menu. Select your unit.

@Home Unit resources: These will appear when you select your unit. For more information: bit.ly/amplifyathomeunits

Teacher Overview	General information for teaching with @Home Units, planning information, chapter and lesson outlines
Lesson Index	Lists the original Amplify Science lessons associated with each @Home lesson, and the Investigation Notebook pages, copymasters, and print materials associated with the @Home Unit Student Sheets
Family Overview	Information to send home to families to help them support students with remote learning
Student lesson materials for @Home Units	Printable or digital lessons condensed to be about 30 minutes long. You can access compilations of all student materials for your unit, or select from individual lessons

@Home Video resources: After selecting your grade level and unit, select the @Home Videos tab below your unit title. For more information: bit.ly/amplifyathomevideos

@Home Video links	Links to video lessons that include all activities from the original units. Lesson playlists are on YouTube, and they autoplay in a playlist form.

Additional remote and hybrid instructional materials: These can be accessed from the tabs below your unit title.

Hands-on investigations support	Videos of every unit's hands-on activities (note, these videos also appear in the student lesson materials)
Read-aloud videos	Link to a YouTube playlist of read-aloud videos of all books in your unit

Orientation and Tutorials

Click Remote and hybrid learning resources, then select your grade from the dropdown menu. Click Orientation and Tutorials. You'll not only find videos to help you use the resources, but also videos you can share with students and caregivers.

Unpacking the Progress Build: Tracking deeper learning through the unit

Read the Progress Build. Make notes in the left-hand column about the key ideas at each level. Pay particular attention to new ideas or vocabulary at each level. Consider how new levels build on or relate to the level(s) before.

	Key ideas
Preconceptions	
Level 1	
Level 2	
Level 3	
Level 4*	

*Most units only have three Progress Build levels.

Review the key ideas in the table. Circle any words or content that seem tricky or that you'd like a refresher on. Search the Science Background document for more information on the words you circled. Make notes below.

Coherence Flowchart jigsaw: How do students figure out key concepts?

Step 1: As a group, look at the evidence sources and reflection opportunities on the Chapter 1 Coherence Flowchart. Each group member chooses a different evidence source or reflection opportunity to learn and present back to the group. Record the evidence source or reflection opportunity you chose in the table below.

Step 2: Become an expert. First, navigate to the lesson listed next to your evidence source or reflection opportunity. Look over the Lesson Brief to determine which activity contains that evidence source (the names won't match up exactly). Then, carefully read the activity. You can use the Instructional Guide or Classroom Slides. Make notes in the table below.

Evidence source or reflection opportunity:	
Lesson and activity:	
What science concepts are students working to figure out? • Consider the key concept they're working towards • Look at "Students learn" in the Lesson Brief	What are students doing? • Consider the modality or modalities (do, talk, read, write, visualize) • Consider the different science skills students are using (e.g. students who are sorting cards may be observing and analyzing images and data)

Coherence Flowchart jigsaw cont.

Step 3: Jigsaw. Each group member shares about their evidence source or reflection opportunity for 1-2 minutes. Other group members take notes in the table below and ask questions.

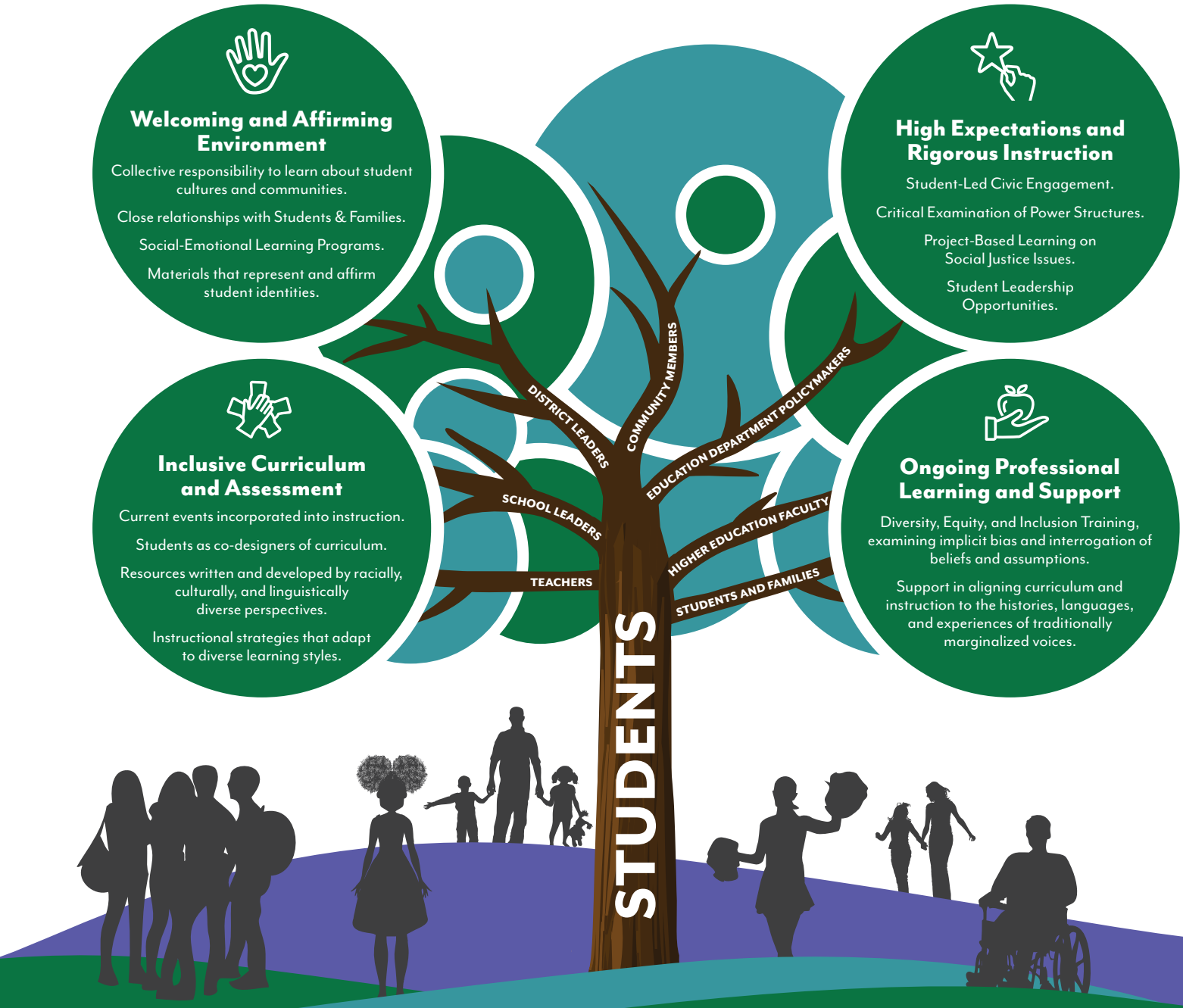
Evidence source or reflection opportunity:	**Evidence source or reflection opportunity:**
Lesson and activity:	**Lesson and activity:**
Notes:	Notes:
Evidence source or reflection opportunity:	**Additional notes**
Lesson and activity:	
Notes:	

Self-assessment: Reflect on your learning

Use the self-assessment statements below to reflect upon and evaluate your learning from today's workshop.

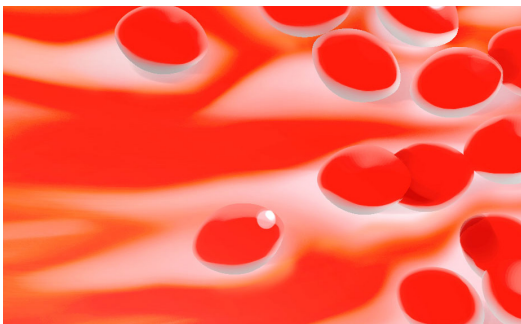
	Strongly Disagree				Strongly Agree
	1	2	3	4	5
I know the phenomenon students will figure out in my unit.	☐	☐	☐	☐	☐
I can navigate to and between lessons in the Amplify Science platform.	☐	☐	☐	☐	☐
I know how to access and edit Classroom Slides decks.	☐	☐	☐	☐	☐
I can describe what learning is like for students in Amplify Science.	☐	☐	☐	☐	☐
I can explain how evidence sources work together in Chapter 1 of my unit.	☐	☐	☐	☐	☐
I can describe how Amplify Science supports students' literacy development (including reading, writing, speaking, and listening).	☐	☐	☐	☐	☐
6-8: I know how to access assessment resources including Classwork, Assign, and Reporting.	☐	☐	☐	☐	☐
I understand how to read a Coherence Flowchart.	☐	☐	☐	☐	☐
I know what types of resources I can find on the Program Hub.	☐	☐	☐	☐	☐
I'm comfortable using the Unit Guide as a resource when looking for a specific piece of information.	☐	☐	☐	☐	☐
I've internalized my unit's Progress Build and I understand the science concepts my students will learn.	☐	☐	☐	☐	☐
I can describe how learning is 3-dimensional in my unit.	☐	☐	☐	☐	☐
I understand how I can use the Coherence Flowchart as a planning tool.	☐	☐	☐	☐	☐
I can describe the purpose of different types of assessments in the Assessment System and supports available to me.	☐	☐	☐	☐	☐
I can visualize how teaching Amplify Science will lead my students to deeper learning.	☐	☐	☐	☐	☐
I know how to access support from Amplify if I need it.	☐	☐	☐	☐	☐

The CR-S framework helps educators create student-centered learning environments that: affirm racial, linguistic and cultural identities; prepare students for rigor and independent learning; develop students' abilities to connect across lines of difference; elevate historically marginalized voices; and empower students as agents of social change.



Amplify Science

Culturally and Linguistically Responsive Teaching in Amplify Science



Our goal in developing Amplify Science is to create high-quality instructional materials that will help create the next generation of scientific innovators as well as citizens who are skeptical, curious, evidence-based thinkers capable of making decisions that improve their lives and the lives of those living in their communities. An essential element of this goal is to support all learners through a focus on equitable teaching and learning.

Creating materials that support culturally and linguistically responsive teaching (CLRT) is one element of supporting all learners. Culturally responsive teaching (Hammond) and culturally and linguistically responsive teaching (Hollie) are part of a family of related pedagogical frameworks that includes culturally relevant pedagogy (Ladson-Billings), culturally relevant teaching (Gay), culturally sustaining pedagogy (Paris & Alim), instructional congruence (Lee & Fradd), linguistically responsive teaching (Lucas & Villegas), historically responsive literacy (Muhammad), and culturally responsive-sustaining education (NYU Metro Center). While there is variation in how these different frameworks characterize equitable teaching and learning, what follows are some common elements, a summary of a few ways we support these in Amplify Science, and areas where we are continuing the work to revise and improve our materials.

1 Identity and representation

Students should see themselves represented in the materials and be supported in developing identities as builders and active users of science knowledge.

Across Amplify Science in media, books, and articles we actively represent the diversity of scientists, engineers, and others involved in the creation and use of scientific knowledge. Working closely with the Our Family Coalition we sought to respectfully and appropriately represent diversity in terms of race, ethnicity, national background, disability, gender, and sexual orientation. An audit of our middle school program estimated that 84% of featured scientists/engineers in articles and videos are in a non-dominant group (including non-white; female; disability; and/or LBGTQ). (Such an audit has not yet been completed for our K–5 program but we expect the results to be similar).

A key element of every Amplify Science unit is that students take on an explicit role as a scientist, engineer, or other professional as they work to figure out a phenomenon and solve a related problem. For example, first graders become aquarium scientists to explain how a sea turtle will be able to survive in the wild; fourth graders take on the role of systems engineers to help a town solve its persistent blackout problems; and seventh graders work as planetary geologists trying to identify whether a channel on Mars might have been formed by running water. In this design, our goal is that students don't just see scientists that they identify with; we want them to identify as scientists themselves.

2 Access to deep learning

Instructional materials should provide all students with access to deep learning. Amplify Science is built around a number of research-based approaches toward this goal and just a few are summarized briefly here.

- Ambitious learning goals. Consistent with the vision presented in the National Research Council Framework, Amplify Science units support students to build complex, causal explanations of phenomena, and to apply their learning to new contexts.
- Explicit support for literacy development. Teachers and students are given explicit support for learning to use discipline-specific ways of reading, writing, and talking in science. In addition, through both instruction and practice, all students are encouraged to engage with complex science text by making connections while reading, asking questions, and discussing these ideas with their peers. Ample support for student-to-student discussion, including the use of discourse routines, helps students refine their thinking and communicate their ideas.

- Multimodal approach to science learning. Students are offered different ways of acquiring knowledge and a variety of resources through which to engage with the content. Multiple entry points to the same complex science ideas provide opportunities for students to connect with content in ways that leverage their unique prior knowledge and experiences. Students are also offered multiple means of expressing their understanding.

- Robust system of formative assessment and support for differentiation. Every lesson includes differentiation suggestions for students who need more support or more challenge. In addition, a robust assessment system, including On-the-Fly Assessments and Critical Junctures, provides tools for assessing student progress as well as "Now what?" guidance about how to use that information.

3 Cultural and linguistic inclusion

This category includes "using the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning encounters more relevant to and effective for them (Gay, 2010, p. 31)" as well as supporting students to leverage multiple meaning-making resources, including everyday language, home language, and translanguaging. (Lee & Stephens, 2020, p. 5). Elements of Amplify Science that support these goals include:

- For Grades K–5, routines around the "Our Experiences" and "What We Think We Know" charts (see the "Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds" document in the Digital Resources for the first lesson in each unit)
- Support for connecting school science to family experiences and expertise, including the Family Connection letters (K–5) and Family Home Experiences (6–8)
- Differentiation supports (found in the Differentiation Briefs) that encourage teachers to leverage students' native languages
- Additional support resources including multilingual glossaries, high-quality Spanish translations for all student-facing materials, and read-aloud tools for books and articles

4 Teaching for social justice.

A fourth category that appears as an element in some of the frameworks above relates to "teaching for social justice" (Barton), "criticality" (Muhammad), or "anti-racist teaching" (Darling-Hammond). The Amplify Science focus on solving real-world problems by figuring out phenomena provides a powerful starting point for efforts to incorporate a social justice focus in the science classroom. In our ongoing work collaborating with districts who are implementing Amplify Science we are both supporting and learning from teachers and instructional leaders as we explore ways to build social justice and anti-racist teaching into Amplify Science.

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For more information, visit amplify.com/science.

Amplify.

THE LAWRENCE HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

Unit Name:
Lesson & Activity #:

Look for 1:

Look for 2: .

Student Name	Look for 1	Look for 2	Notes

Using an Embedded Formative Assessment

Use this graphic organizer to plan for an upcoming assessment in the unit you're currently teaching.

<table>
<tr><td colspan="5">Situating the assessment in the Progress Build: Which level of the Progress Build are students working on during this assessment opportunity?</td></tr>
<tr><td colspan="5">❏ Level 1 Notes:
❏ Level 2
❏ Level 3</td></tr>
<tr><td colspan="2">Planning to collect data</td><td colspan="2">Analyzing student data</td><td>Taking action based on student data</td></tr>
<tr><td>How will I collect data?</td><td colspan="2">Which misconception? What will evidence look like?</td><td>Which students?</td><td>When?</td><td>How?</td></tr>
<tr><td rowspan="2"></td><td colspan="2">❏ Key Concept
❏ Practice
❏ Crosscutting Concept

Notes:</td><td></td><td>❏ In the moment
❏ In upcoming activity
❏ Outside of lesson

Notes:</td><td>❏ Keep an eye on certain students
❏ Provide additional instruction
❏ Revisit an activity

Notes:</td></tr>
<tr><td colspan="2">❏ Key Concept
❏ Practice
❏ Crosscutting Concept

Notes:</td><td></td><td>❏ In the moment
❏ In upcoming activity
❏ Outside of lesson
Notes:</td><td>❏ Keep an eye on certain students
❏ Provide additional instruction
❏ Revisit an activity

Notes:</td></tr>
</table>

Unit Level Planning & Internalization

Unit Title:

Overview

[Resources: Unit Overview, Teacher's Guide, Coherence Flowchart, Unit Map, 3-D Statements]

What is the phenomenon/real-world problem students are investigating in your unit?	Student Role:
Unit Question:	Relationship between the Unit Phenomenon and Unit Question:
By the end of the unit, students figure out…	
How do students engage with three-dimensional learning to figure out the phenomenon/real-world problem in your unit?	

Action Planning: Unit pacing planner

[Resources: School Calendar, School Scope and Sequence, Digital or Print Teacher's Guide]

Unit: **Unit start date:**

Unit Question: **Anchor Phenomenon:**

Chapter 1 Question:					
Lesson 1.1 Date:	Lesson 1.2 Date:				
Chapter 2 Question:					

Chapter 3 Question:					
Chapter 4 Question:					

Guide to completing the Unit pacing planner

Purpose: Along with using your understanding of three-dimensional learning and the Amplify Assessment system, this guide will support you in thinking about the coherence of the unit and how that practically impacts pacing in your classroom for Unit-long implementation, which then informs daily and weekly pacing.

Directions: Use the guiding steps below to plan Unit pacing, using the identified Amplify resources for support.

Step	Action	Amplify resource(s)
1	Identify Performance Expectations (PEs)	• Standards and Goals
2	Identify Unit name, Unit Question, and Anchor Phenomenon	• Lesson Overview Compilation • Unit Map (Unit Question) • Unit Overview (Anchor Phenomenon)
3	Find and record Chapter Questions	• Lesson Overview Compilation
4	Record lesson numbers (e.g., 2.4) and focus	
5	Record Investigation Questions (IQ) in the lesson in which it is introduced	• Lesson Overview Compilation or Coherence Flowchart • Lesson Map (modality indicated next to Activity title in Lesson Map) ○ Modalities: do, talk, read, write, visualize
6	Note which lesson activities are focused on: • Evidence gathering • Reflection (sense-making) • Application back to the anchor phenomenon Make a note of which activities help students meet the PEs.	
7	Identify the location of assessment opportunities embedded throughout the Unit. Use a coding system to indicate each of the three dimensions assessed in each.	• Assessment System identifies three dimensions, Standards and Goals provide each in greater detail. • Embedded Formative Assessments • Three dimensions of NGSS reference (Participant Notebook)
8	Identify and record other information you'll want to think about before teaching a lesson, including those lessons which require great preparation time, which lessons are heavier in literacy, technology, partner-work, etc.	• Materials and Preparation • Lesson Overview Compilation
9	Looking at the school calendar, schedule the date you will teach each lesson. Make adjustments, as needed (e.g., splitting a lesson across two days in the event there is less than the recommended time available, grouping more than one lesson in the event additional time is available).	

Lesson Planning

[Resources: Coherence Flowchart, Digital or Print Teacher's Guide, School Calendar]

Unit:	Lesson:	Date:
Unit Phenomenon:	Chapter Question:	Investigation Question:

[Resources: Lesson Brief (Overview, Standards)]

Lesson Purpose:
How do the activities in this lesson fit together to support students in achieving this purpose?
How does this lesson engage students in three-dimensional learning?

[Resources: Lesson Brief (Materials and Preparation, Unplugged, Digital Resources)]

What materials do you need to prepare?	What will you need to project?	Will students need digital devices?

[Resources: Classroom Slides, Digital or Print Lesson Guide]

Use the prompts below to prepare to teach in the format that best fits your needs: 1) write responses directly into the template below, 2) download and annotate the Printable Lesson Guide, or 3) download Classroom Slides and add your responses in the Notes section.

Lesson Activity	How does each activity support students in answering the Investigation Question (or applying the key concepts to the Chapter Question?	What teacher moves will you need to add to support students in your classroom (partner or grouping structures, additional modeling or scaffolding, space considerations)?	What might be challenging for your students? What additional supports can you plan for individual students? [Resources: Lesson Brief (Differentiation)]	Is there an opportunity to collect data about student understanding to inform instruction? How will you organize the data you collect?
Activity 1				
Activity 2				

Lesson Activity (con't)	How does each activity support students in answering the Investigation Question (or applying the key concepts to the Chapter Question?	What teacher moves will you need to add to support students in your classroom (partner or grouping structures, additional modeling or scaffolding, space considerations)?	What might be challenging for your students? What additional supports can you plan for individual students? [Resources: Lesson Brief (Differentiation)]	Is there an opportunity to collect data about student understanding to inform instruction? How will you organize the data you collect?
Activity 3				
Activity 4				
Activity 5				

[Resources: Lesson Brief (Lesson at a Glance), Lesson Overview Compilation, School Schedule]

How will teaching this lesson fit into your class schedule? Will you need to divide the lesson into activities over several days?	If the lesson is divided into activities over several days, when will students have the opportunity to make sense of the evidence collected and apply it back to the Investigation Question and/or Chapter Question?

Chapter 1 Analysis

[Resources: Assessment System, Progress Build, Coherence Flowcharts, Digital or Print Teacher's Guide]

What is the Chapter Question?	
How does the Chapter Question connect back to the anchor phenomenon?	
What key concepts do students construct in this chapter?	
How are students constructing an understanding of these concepts? *Consider 3D Learning and the Multimodal Approach of Do-Talk-Read-Write-Visualize	
How do the key concepts constructed in Chapter 1 connect to the Progress Build?	
How do students apply the key concepts to the phenomenon/problem to answer the Chapter 1 question? *Use the Coherence Flowchart to find the explanation to the Chapter 1 question.	

Chapter 2 Analysis

[Resources: Assessment System, Coherence Flowcharts, Digital or Print Teacher's Guide]

What is the Chapter Question?	
How does the Chapter Question connect back to the anchor phenomenon?	
What key concepts do students construct in this chapter?	
How are students constructing an understanding of these concepts? *Consider 3D Learning and the Multimodal Approach of Do-Talk-Read-Write-Visualize	
How do the key concepts constructed in Chapter 2 connect to the Progress Build?	
How do students apply the key concepts to the phenomenon/problem to answer the Chapter 2 question? *Use the Coherence Flowchart to find the explanation to the Chapter 1 question.	

Chapter 3 Analysis

[Resources: Assessment System, Coherence Flowcharts, Digital or Print Teacher's Guide]

What is the Chapter Question?	
How does the Chapter Question connect back to the anchor phenomenon?	
What key concepts do students construct in this chapter?	
How are students constructing an understanding of these concepts? *Consider 3D Learning and the Multimodal Approach of Do-Talk-Read-Write-Visualize	
How do the key concepts constructed in Chapter 3 connect to the Progress Build?	
How do students apply the key concepts to the phenomenon/problem to answer the Chapter 3 question? *Use the Coherence Flowchart to find the explanation to the Chapter 1 question.	

Chapter 4 Analysis

[Resources: Assessment System, Coherence Flowcharts, Digital or Print Teacher's Guide]

What is the Chapter Question?	
How does the Chapter Question connect back to the anchor phenomenon?	
What key concepts do students construct in this chapter?	
How are students constructing an understanding of these concepts? *Consider 3D Learning and the Multimodal Approach of Do-Talk-Read-Write-Visualize	
How do the key concepts constructed in Chapter 4 connect to the Progress Build?	
How do students apply the key concepts to the phenomenon/problem to answer the Chapter 4 question? *Use the Coherence Flowchart to find the explanation to the Chapter 1 question.	

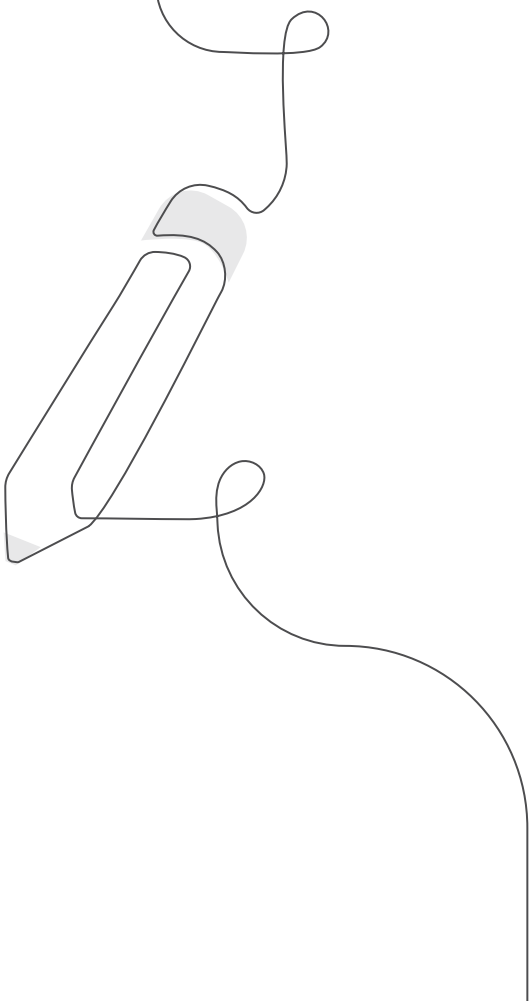
Chapter 5 Analysis

[Resources: Assessment System, Coherence Flowcharts, Digital or Print Teacher's Guide]

What is the Chapter Question?	
How does the Chapter Question connect back to the anchor phenomenon?	
What key concepts do students construct in this chapter?	
How are students constructing an understanding of these concepts? *Consider 3D Learning and the Multimodal Approach of Do-Talk-Read-Write-Visualize	
How do the key concepts constructed in Chapter 5 connect to the Progress Build?	
How do students apply the key concepts to the phenomenon/problem to answer the Chapter 5 question? *Use the Coherence Flowchart to find the explanation to the Chapter 1 question.	

Appendix

1. Assessment system reference
2. Three dimensions of NYSSLS reference
3. Unit Guide scavenger hunt
4. Additional Amplify resources



Assessment System reference (grades K-1)

Assessment type	Description	Student experience	Teacher resources
Pre-Unit Assessment	Formative, 3-D performance assessment meant to gauge students' initial understanding and pre-conceptions about core ideas in the unit	• Full-class teacher-led discussion, supported by visual cues	• Assessment Guide (available in Digital Resources)
End-of-Unit Assessment	Summative, 3-D performance assessment to evaluate students' understanding of core ideas in the Progress Build	• Full-class teacher-led discussion, supported by visual cues	• Rubric and Possible Responses in Assessment Guide (available in Digital Resources)
Critical Juncture Assessments	Embedded formative assessments for assessing students' progress along the Progress Build	• Activities are embedded into existing instructional activities leveraged for assessment opportunities – often student-to-student discussions, investigations, or modeling activities	• Full text of assessment includes "Assess Understanding" section and "Tailor Instruction" suggestions accessible in Instructional Guide by clicking the hummingbird icon • All Critical Juncture Assessments are included in Reference: Embedded Formative Assessments (available in the Unit Guide) • Clipboard Assessment Tool includes tailored sets of questions and the specific activities that present an opportunity to ask those questions. Also included is space to write notes about students' ideas. • Augmenting Instruction notes (accessible in Teacher Support tab) provide additional suggestions for supplemental instruction at the class, group, and student level
On-the-Fly Assessments	Embedded formative assessments for noting students' progress with one or more of the following: science disciplinary core ideas, science and engineering practices, crosscutting concepts, sense-making strategies, and collaborative science work	• Activities are embedded into existing instructional activities, leveraged for assessment opportunities. Artifacts can include full-class or student-to-student discussion, kinesthetic activities, notebook pages, etc.	• Full text of assessment includes what to "Look for" and "Now What?" instructional suggestions accessible in Instructional Guide by clicking the hummingbird icon • All On-the-Fly Assessments are included in Reference: Embedded Formative Assessments (available in the Unit Guide) • Clipboard Assessment Tool includes tailored sets of questions and the specific activities that present an opportunity to ask those questions. Also included is space to write notes about students' ideas.

Assessment System reference (grades K-1) cont.

Assessment type	Description	Student experience	Teacher resources
Student Self-Assessments	Opportunity for students to reflect on whether they understand or don't yet understand the core concepts from the unit	• Reflection prompts through teacher-led discussion and partner talk • Provided at or near the end of each chapter	• Information about Student Self-Assessments in Reference: Assessment System (in Unit Overview) • Teacher Support Notes accessible in Instructional Guide by clicking the Teacher Support tab • Discussion prompts in the Instructional Guide
Investigation Assessments	Summative, 3-D performance assessment to evaluate students' performance of the science and engineering practices of Planning and Carrying Out Investigations and Analyzing and Interpreting Data, as well as their application of disciplinary core ideas and crosscutting concepts	• Prompts for planning investigation and recording results in the Investigation Notebook or a copymaster (available in Digital Resources). Additional support and spoken teacher prompts in K-1. • Physical materials for conducting investigation	• Rubrics and Possible Responses in Assessment Guide (available in Digital Resources) • Possible Responses also accessible in Instructional Guide by clicking the Possible Responses tab
Portfolio Assessments	Opportunity for students to compile and reflect on key work products collected at the end of each unit. Final portfolio compilation occurs at the end of the school year and allows students to select and reflect on work products which they feel best demonstrate their growth in understanding throughout the year	• Compilation of work products that show growth over the course of the year • Reflection on chosen work products • Rubrics for evaluating work products (available in Program Guide → *Assessments → Additional Assessment Resources*)	• Assessment Rubrics (available in Program Guide → *Assessments → Additional Assessment Resources*) • Guidance for communicating to parents about student progress (available in Program Guide → *Assessments → Additional Assessment Resources*)

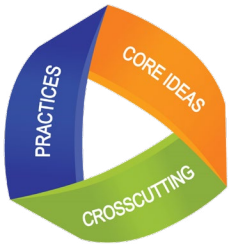
Assessment System reference (grades 2-5)

Assessment type	Description	Student experience	Teacher resources
Pre-Unit Assessment	Formative, 3-D performance assessment meant to gauge students' initial understanding and pre-conceptions about core ideas in the unit	• Pre-Unit Writing copymaster (available in Digital Resources)	• Assessment Guide (available in Digital Resources)
End-of-Unit Assessment	Summative, 3-D performance assessment to evaluate students' understanding of core ideas in the Progress Build	• End-of-Unit Writing copymaster, Versions A and B (available in Digital Resources) • For select units, End-of-Unit Writing Part 2 (available in Digital Resources or the Investigation Notebook)	• Rubric and Possible Responses in Assessment Guide (available in Digital Resources)
Critical Juncture Assessments	Embedded formative assessments for assessing students' progress along the Progress Build	• Written task in the Investigation Notebook • For written explanation and argumentation-based tasks, scaffolded version of assessment provided as a copymaster (available in Digital Resources)	• Full text of assessment includes "Assess Understanding" section and "Tailor Instruction" suggestions accessible in Instructional Guide by clicking the hummingbird icon • All Critical Juncture Assessments are included in Reference: Embedded Formative Assessments (available in the Unit Guide) • Possible Responses accessible in Instructional Guide by clicking the Possible Responses tab • For written explanation and argumentation-based tasks, Rubrics and Possible Responses in Assessment Guide (available in Digital Resources)
On-the-Fly Assessments	Embedded formative assessments for noting students' progress with one or more of the following: science disciplinary core ideas, science and engineering practices, crosscutting concepts, sense-making strategies, and collaborative science work	• Activities are embedded into existing instructional activities, leveraged for assessment opportunities. Artifacts can include discussion, use of a digital tool, notebook pages, etc.	• Full text of assessment includes what to "Look for" and "Now What?" instructional suggestions accessible in Instructional Guide by clicking the hummingbird icon • All On-the-Fly Assessments are included in Reference: Embedded Formative Assessments (available in the Unit Guide)

Assessment System reference (grades 2-5) cont.

Assessment type	Description	Student experience	Teacher resources
Student Self-Assessments	Opportunity for students to reflect on whether they understand or don't yet understand the core concepts from the unit	• Reflection prompts in the Investigation Notebook • Provided at or near the end of each chapter	• Information about Student Self-Assessments in Reference: Assessment System (available in the Unit Guide) • Teacher Support notes accessible in Instructional Guide by clicking the Teacher Support tab
Investigation Assessments	Summative, 3-D performance assessment to evaluate students' performance of the science and engineering practices of Planning and Carrying Out Investigations and Analyzing and Interpreting Data, as well as their application of disciplinary core ideas and crosscutting concepts	• Prompts for planning investigation and recording results in the Investigation Notebook or a copymaster or copymaster (available in Digital Resources) • Materials (physical or digital) for conducting investigation	• Rubrics and Possible Responses in Assessment Guide (available in Digital Resources) • Possible Responses also accessible in Instructional Guide by clicking the Possible Responses tab
Portfolio Assessments	Opportunity for students to compile and reflect on key work products collected at the end of each unit. Final portfolio compilation occurs at the end of the school year and allows students to select and reflect on work products which they feel best demonstrate their growth in understanding throughout the year	• Compilation of work products (written explanations and/or arguments, models) that show growth over the course of the year • Reflection on chosen work products • Rubrics for evaluating work products (available in Program Guide → *Assessments* → *Additional Assessment Resources*)	• Assessment Rubrics (available in Program Guide → *Assessments* → *Additional Assessment Resources*) • Guidance for communicating to parents about student progress (available in Program Guide → *Assessments* → *Additional Assessment Resources*)

Three dimensions of NYSSLS reference



3-D learning engages students in using scientific and engineering practices and applying crosscutting concepts as tools to develop understanding of and solve challenging problems related to disciplinary core ideas.

Science and Engineering Practices

1. **Asking Questions and Defining Problems**
2. **Developing and Using Models**
3. **Planning and Carrying Out Investigations**
4. **Analyzing and Interpreting Data**
5. **Using Mathematics and Computational Thinking**
6. **Constructing Explanations and Designing Solutions**
7. **Engaging in Argument from Evidence**
8. **Obtaining, Evaluating, and Communicating Information**

Disciplinary Core Ideas

Earth and Space Sciences:
ESS1: Earth's Place in the Universe
ESS2: Earth's Systems
ESS3: Earth and Human Activity

Life Sciences:
LS1: From Molecules to Organisms
LS2: Ecosystems
LS3: Heredity
LS4: Biological Evolution

Physical Sciences:
PS1: Matter and its Interactions
PS2: Motion and Stability
PS3: Energy
PS4: Waves and their Applications

Engineering, Technology and the Applications of Science:
ETS1: Engineering Design
ETS2: Links among Engineering Technology, Science and Society

Crosscutting Concepts

1. **Patterns**
2. **Cause and Effect**
3. **Scale, Proportion, and Quantity**
4. **Systems and System Models**
5. **Energy and Matter**
6. **Structure and Function**
7. **Stability and Change**

Unit Guide scavenger hunt

The purpose of this activity is to practice utilizing the Unit Guide resources to answer questions. Practicing now will help you determine which Unit Guide resources to use when questions arise as you're teaching.

Use the Unit Guide resources document to help decide and record which resource you would use to answer each question. For additional practice, open the resource you've identified, and record your answer in the space provided.

What is the Chapter 1 3-D Statement?

Unit Guide document to reference:	Answer:

List a fact or idea that helps you better understand this unit's science content.

Unit Guide document to reference:	Answer:

What's one teacher-provided material you'll need in Chapter 1?

Unit Guide document to reference:	Answer:

Which Chapter 1 lesson requires the most preparation time?

Unit Guide document to reference:	Answer:

What do students do in the first activity of Lesson 3.1?

Unit Guide document to reference:	Answer:

Unit Guide scavenger hunt cont.

Which lessons in Chapter 2 include On-the-Fly Assessments?

Unit Guide document to reference:	Answer:

[GRADES 2-5] Describe an activity that students do with a digital app in the unit.

Unit Guide document to reference:	Answer:

List some of the NGSS crosscutting concepts emphasized in the unit.

Unit Guide document to reference:	Answer:

What is one book that students read in this unit?

Unit Guide document to reference:	Answer:

Describe one notebook page students complete in the unit.

Unit Guide document to reference:	Answer:

Additional Amplify resources

Program Guide

Additional insight into the program's structure, intent, philosophies, supports, and flexibility.

my.amplify.com/programguide

California Edition:
http://amplify.com/science/california/review

Louisiana Edition:
https://my.amplify.com/programguide/content/louisiana/welcome/elementary-school/

Amplify Help

Frequently updated compilation of articles with advice and answers from the Amplify team.

my.amplify.com/help

Family Resources Site

https://amplify.com/amplify-science-family-resource-intro/

Amplify Support

Contact the Amplify support team for information specific to enrollment and rosters, technical support, materials and kits, and teaching support, weekdays 7AM-10PM EST and weekends 10AM-6PM EST.

Email: help@amplify.com

Email: edsupport@amplify.com (pedagogical questions)

Phone: 800-823-1969

Or, reach Amplify Chat by clicking the  icon at the bottom right of the digital Teacher's Guide.

When contacting the support team:

- Identify yourself as an Amplify Science user.
- Note the unit you are teaching.
- Note the type of device you are using (Chromebook, iPad, Windows, laptop).
- Note the web browser you are using (Chrome or Safari).
- Include a screenshot of the problem, if possible. Copy your district or site IT contact on emails.

Notes

Notes

Amplify Science