Amplify Science

Inspiring the next generation of scientists, engineers, and curious citizens

Grades 6-8

authored by THE LAWRENCE HALL OF SCIENCE UNIVERSITY OF CALIFORNIA, BERKELEY
For today’s students to be tomorrow’s innovators and leaders, the 20th-century model of textbook-driven science education will not suffice. The complexities of 21st-century life require a revolutionary approach to science instruction that is real-world relevant and replaces rote memorization with critical thinking.

A collaboration between the curriculum experts at University of California, Berkeley’s Lawrence Hall of Science and the instructional technology experts at Amplify, Amplify Science for grades 6-8 was built from the ground up to address the Next Generation Science Standards and three-dimensional learning, while developing students to become curious, skeptical, evidence-based thinkers.
A powerful partnership

University of California, Berkeley’s Lawrence Hall of Science (LHS) has more than 40 years of experience improving K–12 science education. With 20 percent of K–12 classrooms using a Hall-developed instructional resource, and with legacy programs that include FOSS®, Seeds of Science/Roots of Reading®, GEMS®, SEPUP, and Ocean Sciences Sequence, the Hall’s team has a deep understanding of what makes programs effective.

As the Hall’s first 6–8 science curriculum designed to address the new science standards, Amplify Science reflects state-of-the-art practices in science teaching and learning. Amplify Science’s partnership with LHS runs through 2032 to ensure the program is continuously enhanced and updated.

Amplify has been pioneering K–8 digital education products for more than 15 years, empowering teachers across the country to personalize instruction for every student and to create thriving classroom communities of engaged learners.

Amplify’s award-winning core curriculum programs include Amplify CKLA, Amplify ELA, and Amplify Science. Amplify also recently launched a suite of supplemental products targeting essential skills: Amplify Close Reading, Amplify Fractions, and Amplify Vocabulary.

Amplify has supported more than 200,000 educators and three million students in all 50 states.
Built for new science standards and three-dimensional learning

The Next Generation Science Standards have raised the bar in science education. The new standards aim to move the focus of instruction away from memorization and toward active engagement. In their optimal implementation, the Next Generation Science Standards coach students to think like scientists and engineers, grapple with core scientific principles, and support deep learning of concepts that cut across domains.

We set out to create a science program that educators can use to bring three-dimensional science learning to life. Amplify Science is a robust, multimodal, hands-on program made to fulfill the new science standards, as well as a substantial number of ELA and math standards. Educators who adopt Amplify Science will have access to a comprehensive curriculum complete with detailed lesson plans, embedded assessments, hands-on activities and materials, digital simulations, and robust teacher support resources.
How Amplify Science is designed for three-dimensional learning:

• Students develop expertise in all Practices and deep understanding of Disciplinary Core Ideas and Crosscutting Concepts through repeated experiences within a wide variety of contexts.

• Foundational scientific phenomena, explored through diverse interdisciplinary contexts, ground student progress in cross-domain content and learning.

• Through the use of both hands-on experiments and digital simulations, students investigate real-world problems first-hand, collecting evidence to strengthen their scientific arguments.

• Modeling tools empower students to create, and later revise, visualizations of their understandings of key scientific phenomena at critical points in the curriculum.

• Specific units focused on engineering and technology emphasize that there’s not always one right answer, as students balance competing constraints to design the best justifiable solutions.
Amplify Science includes powerful digital learning tools, hands-on activities, and print materials to support offline teaching and learning. Highly adaptable and user-friendly, the program allows schools and individual teachers flexibility based on their technology resources and preferences.

Teachers typically work on their laptops to access the lesson plans and materials, which they can project to the whole class. Printable teacher guides for every unit and lesson are available in the online curriculum if teachers need or want to work offline at any point.

Students are typically on devices a few days of every week (either in small groups or 1:1), with the option of working offline for most activities using printable PDFs in the online program, including a Student Investigation Notebook for note-taking and other essential activities, paper assessments, and scientific articles.
<table>
<thead>
<tr>
<th>1–1 devices</th>
<th>2–4 students per device</th>
<th>Print/Offline</th>
<th>Projected by teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

- **Reading scientific articles**
- **Writing scientific arguments**
- **Assessments** (formative and summative)
- **Digital simulations**
- **Rich media** (videos, modeling tools)
In each Amplify Science unit, from sixth to eighth grade, students are asked to inhabit the role of a scientist or engineer in order to investigate a real-world problem. These problems provide relevant, 21st-century contexts through which students investigate different scientific phenomena. Once the problem context is clear, students collect evidence from multiple sources and through a variety of modalities. They move back and forth from first-hand investigation to second-hand analysis and synthesis, formulating an increasingly complex explanatory capacity for the problem at hand.

At the culmination of each unit, students have an opportunity to apply their newly acquired knowledge to a similar but different problem in novel and exciting circumstances. It is in this step that students demonstrate a deep understanding of the unit’s key scientific phenomena.
“Instead of students learning (or not learning) a collection of interesting facts about cool critters, my students have a foundational understanding of how animals use their senses to survive, of how light travels and energy is converted, and how variables can change and cause different effects. Hopefully, they have a sturdy schema on which to build future concepts in the life and physical sciences.”

—Steve, middle school science teacher
Amplify Science is rooted in the Lawrence Hall of Science’s Do, Talk, Read, Write, Visualize model of learning. This research-based approach presents students with multiple modalities through which to explore the curriculum. In fact, a recent meta-analysis published in the Journal of Science Teaching supports the efficacy of similar models of multimodal, technology-enhanced instruction, stating that, “science teaching methods focused on enhancing teachers’ classroom instruction throughout the year, such as cooperative learning and science-reading integration, as well as approaches that give teachers technology tools to enhance instruction, have significant potential to improve science learning.”

First-hand investigations are an important part of any science classroom, and Amplify Science has students getting hands-on in every unit, from exploring collision forces to experimenting with electrical systems.

Student-to-student discourse and full class discussions are an integral part of the program, from grades 6–8. Students are provided with numerous opportunities to engage in meaningful oral scientific argumentation, all while fostering a collaborative classroom environment.

Students read scientific articles, focusing their reading activities on searching for evidence related to their investigation, and on asking and recording questions as they read through the text.

Following real-world practices, students write scientific arguments based on evidence they’ve collected, making clear their reasoning that connects the evidence to one of several claims.

Manipulating digital simulations and using modeling tools to craft visualizations of their thinking—just as real scientists and engineers do—students take their learning far beyond the confines of what they can physically see in the classroom in an exciting and authentic way.
Immersive experiences

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.

Hands-on activities

Hands-on learning is at the heart of Amplify Science, and is integrated into every unit. Each hands-on activity provides clear instructions for the teacher, as well as easily accessible materials in unit-specific kits.

Each kit contains hands-on materials, both consumable and nonconsumable, and various print materials (e.g., Vocabulary and Key Concept cards). Each kit supplies sufficient materials for five uses by a class of 40 students.

With Amplify Science, students are able to actively participate in science, gathering evidence, thinking critically, making observations, and communicating their claims.
“In using this program, I have seen that my students are completely engaged and are able to visualize models of concepts using the simulations that they otherwise would not be able to visualize. The program is not about rote memory of facts, rather it addresses the bigger picture and assesses a deeper understanding of science concepts.”

—Julie, Middle School Teacher
Engineering Internships

In a 21st-century science education, students practice using science and engineering in real-life situations to address major challenges that confront society today. Each Engineering Internship unit of Amplify Science invites students to design solutions for a real-world problem by figuring out how to help those in need through the application of engineering and design practices. The units emphasize compassion, sympathy, and the consideration of the needs of diverse peoples, from tsunami victims in Sri Lanka to the special needs of premature babies.
“The engineering units are engaging and really helped me better understand the new standards. I love being able to walk around and talk to students as they explore solutions, make claims, and reason with their peers.”

—Karla, middle school science teacher
A focus on science literacy

Scientists need to be able to read scientific texts, and share written and oral information with their peers. For this reason, science literacy plays a key role in Amplify Science for grades 6–8.

In Amplify Science, students don’t just “read the articles and answer the questions.” Rather, students participate in a process called Active Reading using science articles written by the Lawrence Hall of Science. Active Reading means that students go into their reading activities with a purpose. They go into their reading looking for pieces of evidence to support their scientific arguments; importantly, students are explicitly instructed to ask questions as they read and record those questions.

Science Seminars throughout the program present a unique student-centered argumentation experience that allows them to mimic the role of professional scientists and engineers. As part of the seminar, students prepare by examining evidence, and then participate in a group discussion in which they make sense of evidence and debate which claims are best supported. Students are then asked to craft a final argument based on their experiences. Science Seminars give students an authentic context for applying what they’ve learned, while talking, reading, writing, and arguing like a real scientist or engineer.
Support for all learners

Amplify Science has embedded instructional supports that allow teachers to differentiate their instruction in order to reach every student in their classroom. The program provides scaffolding strategies for teachers in every lesson, and includes automated progress monitoring throughout the curriculum to help ensure that students at all levels engage successfully with the lessons. Whether providing support for struggling students, advanced learners, or students needing extra language support, Amplify Science has embedded strategies that will help teachers reach all their learners.

Suggested EL modifications come in two categories:

1. Relatively small alterations and/or additional scaffolds that provide students with greater access to the content. These are the kinds of scaffolds that benefit all learners, including suggestions about how to provide graphic organizers, practice with multiple-meaning words, etc.

2. EL-specific strategies such as English/Spanish glossaries, native language supports, and provision of cognates and other content-specific language scaffolds in each unit.

English language learner support

Amplify Science includes embedded teacher and student supports in every lesson of every unit. These supports include empirically-based strategies and methods to ensure that EL students are able to have access to the same content as their native English-speaking peers.

Spanish language support

Amplify Science is committed to meeting the needs of all learners, and provides multiple access points for Spanish-speaking students. Developed in conjunction with Spanish experts and classroom teachers, Amplify Science student-facing materials will be available in Spanish for the 2018–2019 school year, including all lesson instructions, science articles, printed materials, and assessments.
# Middle School Curriculum Domain Model

## Earth/Space Science

- Launch: Geology on Mars
- Plate Motion
- Engineering Internship: Plate Motion
- Rock Transformations
- Earth, Moon, and Sun
- Ocean, Atmosphere, and Climate
- Weather Patterns
- Earth’s Changing Climate
- Engineering Internship: Earth’s Changing Climate

## Life Science

- Launch: Microbiome
- Metabolism
- Engineering Internship: Metabolism
- Traits and Reproduction
- Populations and Resources
- Matter and Energy in Ecosystems
- Natural Selection
- Engineering Internship: Natural Selection
- Evolutionary History

## Physical Science

- Launch: Harnessing Human Energy
- Force and Motion
- Engineering Internship: Force and Motion
- Magnetic Fields
- Thermal Energy
- Phase Change
- Engineering Internship: Phase Change
- Chemical Reactions
- Light Waves
# Middle School Curriculum  
**Example Integrated Sequence**

<table>
<thead>
<tr>
<th>Grade 6</th>
<th>Grade 7</th>
<th>Grade 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Launch: Microbiome</td>
<td>• Launch: Geology on Mars</td>
<td>• Launch: Harnessing Human Energy</td>
</tr>
<tr>
<td>• Metabolism</td>
<td>• Plate Motion</td>
<td>• Force and Motion</td>
</tr>
<tr>
<td>• Engineering Internship: Metabolism</td>
<td>• Engineering Internship: Plate Motion</td>
<td>• Engineering Internship: Force and Motion</td>
</tr>
<tr>
<td>• Traits and Reproduction</td>
<td>• Rock Transformations</td>
<td>• Magnetic Fields</td>
</tr>
<tr>
<td>• Thermal Energy</td>
<td>• Phase Change</td>
<td>• Light Waves</td>
</tr>
<tr>
<td>• Ocean, Atmosphere, and Climate</td>
<td>• Chemical Reactions</td>
<td>• Earth, Moon, and Sun</td>
</tr>
<tr>
<td>• Weather Patterns</td>
<td>• Populations and Resources</td>
<td>• Natural Selection</td>
</tr>
<tr>
<td>• Earth’s Changing Climate</td>
<td>• Matter and Energy in Ecosystems</td>
<td>• Engineering Internship: Natural Selection</td>
</tr>
<tr>
<td>• Engineering Internship: Earth’s Changing Climate</td>
<td></td>
<td>• Evolutionary History</td>
</tr>
</tbody>
</table>

*Amplify Science will work with you to design a sequence that will fit your school or district’s needs.*
A partnership with educators

Supporting teachers from day one

Curriculum should be more than a dropped-off kit and list of instructions. At Amplify Science, we view ourselves as partners with each district, school, and teacher, united in our goals of mastering the new science standards and developing students to be skeptical, curious, evidence-based thinkers. From an online teacher’s guide and lesson-specific differentiation strategies to robust professional development, teachers of Amplify Science feel comfortable, confident, and excited to teach. We serve as a nimble, responsive partner throughout implementation to ensure success in making the transition to three-dimensional science teaching and learning.

Professional learning options

Amplify Science offers a range of professional learning options, delivered by the Lawrence of Hall of Science team, to help launch the program and make it successful over the duration of use. Options for teacher professional learning range from onsite workshops that last for several consecutive days to flexible remote webinars.
We provide teachers with the following embedded supports as part of the Amplify Science program:

- An online teacher’s guide
- Step-by-step lesson instructions
- Suggested modifications to customize lessons for different settings
- Expected student responses
- Student assessment reports
- Clear standards alignment
- Implementation support videos
- A help desk ready to respond to questions as they arise
For more information about our K-8 science curriculum, visit:
amplifyscience.com

To view a sample unit from our middle school program, visit:
amplify.com/science/sample
To get a demo and learn more about the Amplify Science curriculum for grades 6-8, get in touch:

(800) 823-1969