Capitalizing on Amplify Science in a responsive relaunch

Guidance for instructional leaders and teachers

The learning disruptions of the past year due to COVID-19 have created wide disparities in the amount and quality of science teaching and learning that has taken place in schools. The resulting unfinished learning in science will vary in each school and classroom, and for each individual student. This document highlights five key features of Amplify Science that can be leveraged in responsive relaunch plans:

1. **Amplify Science is NGSS-designed.**
2. **In Amplify Science units, students are figuring out phenomena.**
3. **Amplify Science has a robust system of formative assessment.**
4. **Amplify Science has a strong emphasis on literacy development.**
5. **Amplify Science is for all students.**

The recommendations outlined in the following pages are intended to support instructional leaders and teachers as they envision what science teaching and learning will look like in the upcoming back-to-school season and beyond.

authored by THE LAWRENCE HALL OF SCIENCE UNIVERSITY OF CALIFORNIA, BERKELEY

Amplify Science

1. Amplify Science is NGSS-designed.

The Next Generation Science Standards (NGSS) are not a list of discrete pieces of knowledge for students to acquire; rather, the **three dimensional structure of the NGSS** supports students in deepening their understanding of disciplinary core ideas across grade bands, by engaging in science and engineering practices and using Crosscutting Concepts. Thus, our systems of relaunch should emphasize helping students continue to progress in their ability to figure out, like a scientist, using all three dimensions.

How can this feature of Amplify Science support our responsive relaunch plans?

- Amplify Science learning experiences are three dimensional.
- The Science and Engineering Practices (SEP) and Crosscutting Concepts (CCC) are not specified at each grade level but rather defined with increasing sophistication in each grade band (K–2, 3–5, 6–8). Therefore there is no "loss" of these dimensions, only opportunities to strengthen them in the upcoming year.
- The content in the Disciplinary Core Ideas (DCI) spirals and is not taught in each grade level, but rather in each grade band (K–2, 3–5, 6–8). This means there are no direct dependencies in teaching one grade level's content from the grade level prior.
- Each Amplify Science unit can be taught independently and includes supports to make sure all students can succeed regardless of their prior instruction. For unit-specific information, see the Standards and Goals Unit Guide document in the section called, "How This Unit Fits into the Amplify Science Curriculum." This section provides useful information about where a unit's ideas fit in the trajectory of core ideas, as well as guidance around prerequisite knowledge for accessing the unit.

What are recommendations for capitalizing on this feature of Amplify Science?

- Move forward with this year. Focus on the current grade level standards and units rather than working to identify "missing" content or trying to backfill discreet science ideas from the previous year.
- Continue strengthening the use of the Science and Engineering Practices and Crosscutting Concepts. Authentic engagement and development of these scientific critical thinking skills is what allows students to apply their knowledge to real-world situations in and out of the classroom.
- Use a system of formative assessment to monitor student understanding (see more details in the next feature).

Can I continue to use the Amplify Science @Home Units in my responsive relaunch plans?

As you transition back to in-person learning, it's time to shift back to the standard Amplify Science curriculum to fully meet the NGSS. The @Home Units were designed only for use in remote and hybrid teaching settings. During the year of disrupted schooling, they provided a way for all students, regardless of time constraints or materials access, to be exposed to activities related to figuring out phenomena. To create these instructional materials, about 50% of activities were cut, resulting in learning experiences that do not fully engage students using all three dimensions. Examples include: less explicit instruction in disciplinary literacy practices, modifications to hands-on investigations, limited opportunities for student-to-student discourse, and a reduction of opportunities to apply and reflect. Because these are core components of students' engagement in deep learning towards figuring out phenomena, we do not recommend using the @Home Units for in-person instruction. As needed, the materials can be used in instances where a student is absent, as they can be completed asynchronously.

2. In Amplify Science units, students are figuring out phenomena.

Figuring out phenomena can be a source of motivation, relevance, and deep learning for all students. When students explore real-world issues and work to explain those using authentic scientific reasoning, they simultaneously gain an understanding of scientific concepts and develop skills to take that knowledge with them, positioning them for college and career readiness. A phenomena-based approach supports a shift to figuring out (like a scientist) rather than learning about topics (like a student).

How can this feature of Amplify Science support our responsive relaunch plans?

- In each Amplify Science unit, students take on the role of a scientist or engineer as they figure out a real-world phenomenon and solve a related problem.
- Each Amplify Science unit is designed to be a coherent sequence of instruction. Students build an understanding of the anchor phenomenon bit by bit over the course of each chapter to reach a cumulative understanding of the science ideas by the end of the unit, then are able to apply their understanding to a new context.

What are recommendations for capitalizing on this feature of Amplify Science?

- Focus on quality teaching of full Amplify Science units, even if it means fewer units will be taught.
- Protect science time, particularly in elementary school. In a situation where science time is not adequately protected in instructional schedules students are denied the opportunity to become curious, skeptical, critical thinkers who are ready to tackle more complex scientific ideas in the years to come.

If pacing needs to slow down, particularly at the beginning of the year, it is best to teach an entire unit well rather than teaching parts of units. If you need to make choices for units you could consider the following:

- There are no "power standards" or "priority content" identified for science; all standards are important.
- In Amplify Science Grades K–5, we suggest following the Amplify Science scope and sequence to start with the first unit in the year. This is particularly important in grades K–1 where the units represent a developmental progression throughout the year.
- In Amplify Science Grades 6–8, you will likely want to begin with a launch unit. Launch units introduce students to norms, routines, and practices that will be built on throughout the year, such as argumentation and Active Reading, as well as the use of Amplify Science technology. If you are using an integrated course sequence you may want to make sure you teach at least one Earth, one life, and physical science unit over the course of the year.

3. Amplify Science has a robust system of formative assessment.

Monitoring student progress via formative assessments is always an essential practice in science instruction to ensure that all students are making progress towards learning goals, regardless of an individual's background knowledge, the time they've spent learning science, and their language proficiency. With the prospect of unfinished learning from the year prior, it will be necessary to elevate the practice of formative assessment to closely monitor student understanding, track student progress, and be able to offer just-in-time support.

How can this feature of Amplify Science support our responsive relaunch plans?

The Amplify Science Assessment System:

- is part of a system that offers many types of views of student learning.
- is embedded in the curriculum, which can help maximize learning time instead of setting aside additional time for testing.
- includes assessment of all three dimensions.
- allows students to demonstrate understanding in multiple ways (e.g. modeling, talking, writing).
- provides guidance for the teacher so they can both gain insight into student understanding and be able to offer just-in-time support.

What are recommendations for capitalizing on this feature of Amplify Science?

- Get to know the formative Assessment System and plan for how to use it to provide targeted feedback and support.
- Keep moving forward with instruction, but allow time as needed to gather data and respond to student progress via the system of embedded formative assessments.

Getting to know the Amplify Science Assessment System

- A good first step in preparing to implement the Amplify Science Assessment System is reading the Progress Build Unit Guide document for the unit. This document clearly spells out the learning progression that the assessment system is built around.
- Next, open and review the Assessment System Unit Guide document. This provides a full list of the assessments across the unit with information on placement, evaluation guidance, and the connection to the standards.
- Another resource in the Unit Guide is the Embedded Formative Assessment document. This resource details the specific concepts and practices to look for or listen for as students engage with the learning experiences, followed by suggestions to the teacher of what to do, based on what was observed.
    - This resource points out the different NGSS connections for each assessment opportunity which can help teachers make principled choices about which assessments to use. This can be supportive if teachers are specifically looking for which opportunities assess student conceptual understanding, reflected in the DCIs.
- In planning for monitoring student progress across a unit, teachers should consider what tools can be used to track data that meet the needs of their classroom.
    - Sample Tracker (**template**)
    - Sample Tracker for Grade 3: Balancing Forces, lesson 2.5 (**completed**)
- K–1 teachers can use provided Clipboard Assessment Tools (K–1, located in the Digital Resources at the lesson level).
    - Sample Clipboard Assessment Tool from Grade 1: Spinning Earth, Chapter 2 (**template**)
    - Sample Clipboard Assessment Tool from Grade 1: Spinning Earth, Chapter 2 (**completed**)
- Tracking progress based on the "look for" and "now what" guidance provided in the Embedded Formative Assessment Unit Guide document and at the lesson level will support teachers in using data to inform instruction.

4. Amplify Science has a strong emphasis on literacy development.

Reading, writing, listening and speaking are fundamental aspects of students' work to figure out complex ideas in science. Engaging in these core practices through science can be leveraged to accelerate learning in English Language Arts (ELA) and address a variety of priority instructional content related to building content knowledge through reading, writing and engaging in discourse about topics across content areas, building content-specific vocabulary, and keeping complex text at the center of literacy instruction.

How can this feature of Amplify Science support our responsive relaunch plans?

- Amplify Science can be considered a **supplementary literacy program** because it addresses the Common Core Standards for ELA related to disciplinary literacy.
- The focus of literacy instruction in Amplify Science is on increasing students' facility with reading informational text, engaging in scientific discussions, and writing scientific explanations and arguments.
- The program includes content-rich books (K–5) and articles (6–8), both formal and informal writing opportunities, all of which is supported by explicit instruction as well as a variety of developmentally-appropriate scaffolds, supports and routines for engaging in robust literacy and language development.

What are recommendations for capitalizing on this feature of Amplify Science?

- Teach full units with integrity to provide students with the explicit instruction and practice opportunities with developing disciplinary literacy.
- Be aware of CCSS-ELA standards addressed in Amplify Science to see where there are opportunities for overlap and to strengthen practices in Language Arts. Capitalizing on these synergies can also help to protect science time.
- Leverage opportunities to have students engage in scientific discourse.

5. Amplify Science is for all students.

Amplify Science was designed with the goal of developing high-quality instructional materials that will help create the next generation of scientific innovators and members of the global community who are skeptical, curious, evidence-based thinkers capable of making decisions that improve their own 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, as mirrored in the NGSS's vision for "all standards, all students." Because diversity in the science and engineering classroom is an asset, we must all strive to support students in developing identities as builders and active users of science knowledge, promote cultural and linguistic inclusion, and provide access to deep learning.

How can this feature of Amplify Science support our responsive relaunch plans?

- A phenomena-based approach puts students at the center; they are the ones doing the figuring out.
- The phenomena-based storylines of each unit provide opportunities to have students' voices matter. The class gathers student questions and elicits students' experiences and ideas at the beginning of the unit, and then revisits these funds of knowledge at key points in each chapter. (In K-5, see the Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds routine).
- Amplify Science media, books, and articles represent the diversity of scientists, engineers, and others involved in the creation and use of scientific knowledge.
- Amplify Science lessons are designed with a variety of rich opportunities to acquire and use scientific language. These embedded supports benefit all learners but are particularly supportive for English learners. The teacher support materials such as the differentiation briefs include additional ideas for supporting English learners and diverse learners.
- In Amplify Science, students engage in learning through multiple modalities. This provides multiple entry points to the same complex science ideas and multiple ways for students to express their understanding.

What are recommendations for capitalizing on this feature of Amplify Science?

- Take time to **establish a culture of figuring out**. This means providing students the space to make connections, ask questions, and become curious about the phenomena as they figure out more and more. This supports students to feel empowered, to develop their identity as a scientific thinker, and feel like they have agency over their own learning. A culture of figuring out:
  - Values student questions.
  - Leverages students' prior knowledge, personal experiences, and cultural backgrounds
  - Connects the unit phenomena to local and relevant phenomena.
  - Allows for a variety of sensemaking types and paces
  - Has the teacher take on the role of an interested skeptic.
- Utilize the differentiation notes in the Lesson Brief of each lesson to adapt instruction for students who need more challenge, students who need more support, and for emerging multilingual learners.

References

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3. National Academies of Sciences, Engineering, and Medicine. 2020. Teaching K-12 Science and Engineering During a Crisis. Washington, DC: The National Academies Press. **http://nap.edu/25909**

4. Student Achievement Partners, 2020-2021 Priority Instructional Content for ELA/Literacy and Mathematics **https://achievethecore.org/page/3267/priority-instructional-content-in-english-language-arts-literacy-and-mathematics**