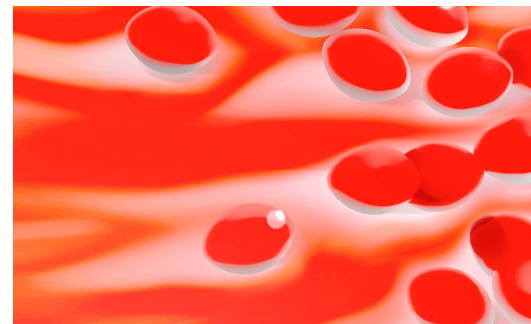


Culturally and Linguistically Responsive Teaching in Amplify Science





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 LGBTQ). (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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