Make lessons accessible for all
Design lessons and challenges with multiple entry points, so that students from a variety of backgrounds and abilities can engage in solving them. “In school, we typically think there should be a single solution to a problem,” McAdams says. “But the beauty of STEM is that there are often multiple solutions. Creating open-ended activities and accepting many pathways to solving problems speaks to this idea that we have diverse learners in our classrooms.”

Provide hands-on learning experiences
Research shows that students learn more effectively if they can take part in an activity instead of just reading about it. “We know that students like to do hands-on activities,” McAdams says. “But we’re also seeing that outcomes are better across all domains when we include hands-on learning experiences.”

Make connections to STEM careers in context
Students should be exposed to STEM careers in the context of what they’re learning in class. This helps answer the age-old question: “Why are we learning this?” What’s more, they should be introduced to STEM professionals of similar genders, races, and backgrounds. “We have to give students role models who look like them,” McAdams says. “To borrow a phrase from Marian Wright Edelman: ‘You can’t be what you can’t see.’”

Use real-world examples to give lessons meaning
“Cooked-up data and invented problems are not going to cut it for today’s kids,” McAdams notes. “We need to put authentic, challenging problems that are truly engaging in front of students.” Discovery Education does this by using content frameworks from the National Academy of Engineering’s Grand Challenges and the United Nations’ Sustainable Development Goals, which focus on solving global challenges such as food security and making solar energy more economical. “These are real problems that adults across the world are trying to tackle,” McAdams says. “We shouldn’t think that we have to water them down for students.”

“We need to put authentic, challenging problems that are truly engaging in front of students.”
Integrate STEM values across all disciplines
The values underlying STEM learning include persistence, curiosity, and empathy. “The Society of Women Engineers has done a lot of research on how to involve more girls in engineering to overcome the gender disparity,” McAdams says. “One thing that really resonates with girls is talking about how engineers make a difference in people’s lives. We want to instill this value of empathy, where students put themselves in the shoes of whoever they are designing for.”

Use a “Four Cs” instructional framework
The “four Cs” of communication, collaboration, creativity, and critical thinking are important workforce skills—and they lie at the heart of STEM learning as well. But it’s important to approach these skills in a developmentally deliberate way. “Collaboration looks very different for kindergarteners and first graders than it does for middle and high school students,” McAdams explains. “At Discovery Education, we have developed a framework that is graduated in its approach. While younger students need more scaffolding and teacher support, we should be expecting older students to self-monitor and self-enforce.”

Show how global impact starts locally
Taking on large, real-world problems is important, but some students will find it more meaningful to consider issues in their own backyard. For example, how does food security affect the local population—and what can students do to help? “While connecting students with their peers around the world to solve global problems has a lot of value, sometimes it makes these challenges more accessible to look at how they are impacting students’ own communities,” McAdams says.

Build literacy skills every step of the way
Our notion of literacy has evolved, and in many states, students now must be able to make sense of complex nonfiction texts. But educators shouldn’t stop there, McAdams says: “We also want students to be able to communicate their ideas effectively, using not only facts and evidence but also personal anecdotes. When you think about some of the greatest orators in history—people who were successful at moving a crowd and influencing decisions—they not only had data to back up their position, but they were good at telling a story and weaving together their ideas.”