SCIENCE EDUCATION IN THE 21ST CENTURY

Why K–12 Science Standards Matter—and why the time is right to develop Next Generation Science Standards

Why Next Generation Science Standards (NGSS)?

- It has been 15 years since science standards were revised. Since that time, many advances have occurred in the fields of science and science education, as well as in the innovation-driven economy.
- The U.S. has a leaky K–12 STEM talent pipeline, with too few students entering STEM majors and careers at every level—from those with relevant postsecondary certificates to PhD's. We need new science standards that stimulate and build interest in STEM.
- We can't successfully prepare students for college, careers and citizenship unless we set the right expectations and goals. While standards alone are no silver bullet, they do provide the necessary foundation for local decisions around curriculum, assessments, and instruction.
- Implementing improved K–12 science standards will better prepare high school graduates for the rigors of college and careers. In turn, employers will be able to hire workers with strong science-based skills—including specific content areas but also skills such as critical thinking and inquiry-based problem solving.

What Are the Next Generation Science Standards?

- The Next Generation Science Standards (NGSS) will create K–12 science standards through a collaborative state-led process.
- The NGSS will be arranged in a coherent manner across grades and provide all students access to a challenging science education, and be based on the *Framework for K–12 Science Education*, developed by the National Research Council, the staffing arm of the National Academy of Sciences.
- Every NGSS standard has three prongs: content, scientific and engineering practices and cross-cutting concepts. The integration of rigorous content and application reflects how science is practiced in the real world.

How Are the NGSS Being Developed?

- The NGSS are being developed in a two-step process in partnership with the National Research Council (NRC), the National Science Teachers Association (NSTA), the American Association for the Advancement of Science (AAAS) and Achieve.
- The *first step* was the development of the *Framework for K–12 Science Education* by the National Academies of Science that identified the broad ideas and practices in natural sciences and engineering that all students should be familiar with by the time they graduate from high school.
- The *second step* is the development of standards based on the *Framework*, which will engage science educators and experts from around the country who will serve as writers and

will produce drafts of the standards. Achieve is managing this process on behalf of the lead states.

- Twenty-six states are lead state partners in the NGSS development effort.
- There will be two open comment periods where feedback on the draft standards will be open for public comment. The first will occur late spring 2012 and the second will be in the fall of 2012.
- The NGSS are expected to be completed by early 2013. It will then be up to state to determine whether and when to consider adopting the NGSS as their states' science standards.
- States working together to develop and implement NGSS standards makes good common sense—it offers opportunities for states to share best practices, leverage economies of scale in the education marketplace, and will ensure all students—in any state and any district that adopts them—gain the knowledge and skills they need for success in college and careers.

The Urgency for Next Generation Science Standards:

- In 2007, a Carnegie Corporation of New York/Institute for Advanced Study commission of researchers and public and private leaders concluded that *"the nation's capacity to innovate for economic growth and the ability of American workers to thrive in the modern workforce depend on a broad foundation of math and science learning, as do our hopes for preserving a vibrant democracy and the promise of social mobility that lie at the heart of the American dream."*
- Unfortunately, science and mathematics achievement continues to lag compared to our international competitors, and this lag has already begun to impact the competitiveness of young Americans as well as the competitiveness of the U.S. in the global economy.

  For example:

  - The U.S. ranked 17th in science and 25th in mathematics on the 2009 PISA assessment. Less than 10 percent of U.S. students scored at one of the top two of six performance levels.
  - More than a third of eighth-graders scored below basic on the 2009 NAEP Science assessment.
  - U.S. high-tech manufacturing industries continue to have a larger share of global output than any other economy, but the U.S. global share fell from 34% in 1998 to 28% in 2010.
  - The U.S. share of global high tech exports dropped from 19% to 15% in 2010; at the same time China's share of global high tech goods exports more than tripled, from 6% in 1995 to 22% in 2010, making it the single largest exporting country for high tech products.