

Next Generation Science Standards (NGSS)



WHAT ARE THE NEW SCIENCE STANDARDS?

The Next Generation Science Standards (NGSS) are a new set of K–12 science standards that were developed by states, for states. The NGSS identify scientific and engineering practices, crosscutting concepts, and core ideas in science that all K–12 students should master in order to prepare for success in college and 21st-century careers.



WHY ARE THEY IMPORTANT?

It has been more than 17 years since the National Research Council and the American Association for the Advancement of Science produced their reports from which most state science standards are based. Since then, there have been major advances in science and our understanding of how students learn science. Students need the kind of preparation that gives them the tools and skills necessary to succeed in a rapidly and continuously changing world.

When current students graduate from high school, more jobs will require skills in science, technology, engineering, and mathematics (STEM) than in the past. The NGSS provide a strong science education that equips students with the ability to think critically, analyze information, and solve complex problems — the skills needed to pursue opportunities within and beyond STEM fields.

HOW WERE THEY DEVELOPED?

The NGSS were developed through a collaborative state-led process. Science supervisors from 26 states worked with a 40-member writing team—which included teachers, working scientists, and education researchers—to develop the draft standards, based on the National Research Council’s document *A Framework for K–12 Science Education*. Each of the 26 states established a broad-based committee to review draft standards and provide feedback. In addition to those reviews, a larger stakeholder team composed of hundreds of members representing K–12 educators, administrators, higher-education faculty, scientists, engineers, business leaders, policymakers, and key organizations provided feedback during five review periods. The draft standards went through two public review periods and received comments from more than 10,000 individuals.



HOW WILL THE NGSS SUPPORT COLLEGE AND CAREER READINESS FOR ALL STUDENTS AND PREPARE THEM TO SUCCEED IN THE GLOBAL ECONOMY?



A high-quality, robust science education means students will develop an in-depth understanding of content and will gain knowledge and develop skills—communication, collaboration, inquiry, problem solving, and flexibility—that will serve them throughout their educational and professional lives.

The NGSS were benchmarked against countries whose students perform well in science and engineering fields, including Finland, South Korea, China, Canada, England, Hungary, Ireland, Japan, and Singapore.

WHAT WILL THE NGSS LOOK LIKE IN THE CLASSROOM?

High-quality education standards allow educators to teach effectively, moving their practice toward how students learn best—in a hands-on, collaborative, and integrated environment rooted in inquiry and discovery. Teaching based on the NGSS calls for more student-centered learning that enables students to think on their own, problem solve, communicate, and collaborate—in addition to learning important scientific concepts.

THE NGSS OFFER FIVE INNOVATIONS FOR TEACHING

1

Three Dimensional Learning: There are three equally important, distinct dimensions to learning science included in the NGSS: Scientific and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas. The NGSS connect all three dimensions. To prepare students for success in college and 21st century careers, the NGSS also connect scientific principles to real-world situations, allowing for more engaging and relevant instruction to explore complicated topics.

2

All three dimensions build coherent learning progressions: The NGSS provide students with continued opportunities to engage in and develop a deeper understanding of each of the three dimensions of science. Building on the knowledge and skills gained from each grade—from elementary through high school—students have multiple opportunities to revisit and expand their understanding of all three dimensions by the end of high school.

3

Students engage with phenomena and design solutions: In instructional systems aligned to the NGSS, the goal of instruction is for students to be able to explain real-world phenomena and to design solutions using their understanding of the Disciplinary Core Ideas. Students can achieve this goal by engaging in the Science and Engineering Practices and applying the Crosscutting Concepts.

4

Engineering and the Nature of Science is integrated into science: Some unique aspects of engineering (e.g., identifying problems) are incorporated throughout the NGSS. In addition, unique aspects of the nature of science (e.g., how theories are developed) are also included throughout the NGSS as practices and crosscutting concepts.

5

Science is connected to math and literacy: The NGSS not only provide for coherence in science instruction and learning but the standards also connect science with mathematics and English Language Arts. This meaningful and substantive overlapping of skills and knowledge affords all students equitable access to the learning standards.

COMMON MISCONCEPTIONS ABOUT THE NGSS

Myth: The NGSS were developed by the United States Department of Education.

FACT: The Next Generation Science Standards (NGSS) were developed through a collaborative state-led process. Twenty-six states volunteered to work with the 40 members of the writing team to lead the development of the standards, and each state formed broad-based committees to work on the standards.

Myth: The NGSS were developed without public input.

FACT: The draft standards received comments from more than 10,000 individuals during each of two public review periods. These comments came from teachers, school and school district discussion groups, scientific societies, parents, and students. In addition, an expert team composed of hundreds of members representing K–12 educators, administrators, higher education faculty, scientists, engineers, business leaders, policymakers, and key organizations provided confidential feedback during critical points of the development process.

Myth: The NGSS were developed without teacher input.

FACT: To develop the standards, the science supervisors in the 26 lead states worked with a 40-member writer team, all of whom were education experts and more than half of whom were practicing K–12 teachers. Thousands of teachers also provided comments to the draft standards during the two public review periods and as part of expert review panels.

Myth: The NGSS will force states and districts to adopt a uniform curriculum.

FACT: The NGSS are standards, not curricula. Local districts, schools, and classroom teachers will continue to determine their own curriculum, including what is taught throughout the year and how it is taught.

Myth: The NGSS are part of the Common Core.

FACT: The NGSS are not part of the Common Core State Standards (CCSS). The CCSS only cover mathematics and English Language Arts (ELA)/literacy whereas the NGSS are a separate set of K–12 science standards that were drafted through a distinctly different process.

Myth: The NGSS are funded with federal dollars.

FACT: No federal funding, grants, or formula funding is tied to the adoption of the NGSS nor was used to develop them. The Carnegie Corporation of New York, a foundation dedicated to improving science education in the U.S., provided funding support for the development of the NGSS.

Myth: The NGSS are too rigorous for students who have no intention of pursuing science after high school.

FACT: Science is a key factor in students' ability to think critically and innovate. All students need strong foundational knowledge in science to tackle long-term and difficult issues that face our generation and future generations. A strong science education equips students with skills that are necessary for lasting success in their postsecondary lives and careers.

Myth: The NGSS are not rigorous enough for students interested in advanced classes in high school and beyond.

FACT: The NGSS does not set a ceiling for student achievement. Students who wish to take advanced coursework will still have the opportunity to do so, and the NGSS will provide them with a solid academic foundation for college-level science courses.