

Requirements of implementing next generation science standards

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A new report released today by the National Research Council offers guidance to district and school leaders and teachers on necessary steps for putting the Next Generation Science Standards (NGSS) into practice over the next decade and beyond. The committee that wrote the report drew on A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas, a 2011 Research Council report that served as the foundation for the Next Generation Science Standards. These standards are informed by research findings that emphasize that science and engineering involve both knowing and doing; that developing rich, conceptual understanding is more productive for future learning than simply memorizing discrete facts; and learning experiences should be designed with coherent progressions over multiple years.

"The NGSS present a vision of [science](#) and engineering learning that brings these subjects alive for all students, emphasizing the satisfaction of pursuing compelling questions and the joy of discovery and invention," said Helen Quinn, committee chair and professor emerita of particle physics and astrophysics at the Stanford Linear Accelerator Center at Stanford University. "While 13 states and the District of Columbia have already adopted the NGSS, achieving this vision in all science classrooms will be a major undertaking and will require changes to many aspects of [science education](#)."

The committee's recommendations cover the major elements of the education system that should be considered when implementing the NGSS, including:

- **Teacher and leader learning:** State, district, and school leaders should develop comprehensive multiyear plans for professional development for teachers and administrators that balance existing resources, meet expectations for milestones in NGSS implementation, and take advantage of available tools and partners.
- **Curriculum resources:** Because full sequences of curriculum materials designed explicitly for NGSS have not yet been developed, states, districts, and schools should not rush to replace course materials. Instead, district leadership teams should work with teachers to revise existing curriculum units and identify supplemental resources to support the new vision of instruction.
- **Assessment:** Because past science assessments have chiefly focused on knowledge of facts and procedures, rather than scientific and engineering practices, state science education leaders should create a new system of assessment and monitoring, as well as support teachers in carrying out this change.
- **Collaboration, networks, and partnerships:** Science education leaders should reach across the traditional boundaries of schools, districts and, states to share information and expertise and identify potential partners, such as informal education institutions, community organizations, and businesses.
- **Policies and communication:** State, district, and school leaders should ensure that state and local policies are consistent with the goals of implementing NGSS, as well as develop a strategy for communicating with parents and community members about the new standards and their implementation.
- **Instruction:** Science education leaders should clearly communicate an approach to instruction that is consistent with the framework and NGSS and ensure that their actions, policies, and resource allocations are aligned to support it. Teachers should develop a classroom culture that reflects this approach

and make assessment part of instruction.

Along with an understanding of the vision described in the framework, the committee identified the following seven principles by which implementation of the NGSS should be guided:

- Attend to what is unique about science.
- Develop and provide continuing support for leadership in science at the state, district, and school levels.
- Build and leverage networks, partnerships, and collaborations.
- Take enough time to implement well.
- Make equity a priority.
- Ensure that communication is ongoing and relevant.

More information: www.nap.edu/catalog/18802

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