

AN OVERVIEW FOR PRINCIPALS

The purposes of this document are to introduce principals to the Next Generation Science Standards (NGSS) and provide a general overview of the key instructional and conceptual shifts required by the NGSS. Principals have a critical role to play in the implementation process and this resource can be a guide for administrators working in states that have recently adopted new K-12 science standards, based on the NGSS.

What are the NGSS?

The NGSS are standards with a purpose. The K-12 science content standards cover every grade and every scientific discipline, setting expectations for what students should know and be able to do in science.

A major difference between the NGSS and previous science standards is "three-dimensional" (3D) learning.

3D learning refers to the thoughtful and deliberate <u>integration of three distinct dimensions</u>: Scientific and Engineering Practices (SEPs), Disciplinary Core Ideas (DCIs), and Crosscutting Concepts (CCCs).

Through 3D learning, the NGSS emphasize that science is not just a series of isolated facts. This awareness enables students to view science more as an interrelated world of inquiry and phenomena rather than a static set of science disciplines.

The NGSS represent a fundamental shift in science education and require a different approach to teaching science than has been done in the past. Looking ahead, teachers can use a range of strategies to engage students and create opportunities to demonstrate their thinking and learning.

How will science education change with the NGSS?

Science education will involve less:

- Learning of ideas disconnected from questions about phenomena
- Teachers providing information to the whole class
- Teachers posing questions with only one right answer
- 4. Student reading textbooks and answering questions at the end of each chapter
- Worksheets

6. Oversimplification of activities for students who are perceived to be "less able" to do science and engineering

Science education will involve more:

- Systems thinking and modeling to explain phenomena and to give a context for the ideas to be learned
- Students conducting investigations, solving problems, and engaging in discussions with teacher guidance
- Students discussing open-ended questions that focus on the strength of the evidence used to generate claims
- 4. Students reading multiple sources and developing summaries of information
- 5. Student writing of journals, reports, posters, and media presentations that offer explanations and arguments
- **6.** Provision of supports so that *all* students can engage in sophisticated science and engineering practices

What are key questions that principals should consider during implementation?

- What kind of professional development is available and how do I ensure my teachers and I have access to it? How do I know if it's high quality?
- What NGSS-aligned instructional materials do my teachers and students need and how do I make sure they get them? How do I know if the materials are high quality?
- What formative assessments are available to help teachers continually evaluate their students' learning?
- How can we connect the NGSS with work we are doing to improve teaching and learning in English language arts and math?

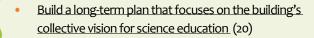
What can principals do to support implementation?

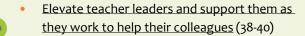
- Focus on what the students are doing first and then think about what the teacher has designed to make that happen;
- Know the standards enough to identify and provide feedback on aspects of the three dimensions during classroom visits
- Engage teachers on how the three dimensions are incorporated into lessons.

For more information about the NGSS

- http://www.nextgenscience.org/ (Official Homepage of the NGSS)
- http://www.nsta.org (National Science Teachers Association)
- http://stemteachingtools.org/ (STEM Teaching Tools)
- http://www.nap.edu/read/18802/chapter/1 (National Research Council's Guide to Implementing the NGSS)

Additionally, principals can:





- Find ways to provide high-quality, intensive professional learning to all teachers (41-46)
- Seek out professional learning for yourself (49)
- Connect what is happening with science in your building to other buildings in your district, state, or any NGSS-adopted state (70-73)
- Be critical consumers of any new curricula (56, 57)
- Provide leadership to develop or revise a system of assessment for measuring student learning in science (61-66)

All parenthetical numbers above refer to pages in the National Research Council's Guide to Implementing the Next Generation Science Standards.



What are some common pitfalls that can undermine successful implementation?

- Expecting instruction to change overnight (35)
- Expecting teachers to do it alone (35)
- Asking "Which standard are you teaching today?" (58)
- Failing to communicate with parents and community about what is changing and why you are changing it (84)

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