

The purposes of this document are to introduce the Next Generation Science Standards (NGSS) and provide a general overview of the key instructional and conceptual shifts required by the NGSS. During the state’s four year implementation process and this resource can be a guide 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 integration of three distinct dimensions: 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:

1. Learning of ideas disconnected from questions about phenomena
2. Teachers providing information to the whole class
3. Teachers posing questions with only one right answer
4. Student reading textbooks and answering questions at the end of each chapter
5. Worksheets
6. Oversimplification of activities for students who are perceived to be “less able” to do science and engineering

Science education will involve more:

1. Systems thinking and modeling to explain phenomena and to give a context for the ideas to be learned
2. Students conducting investigations, solving problems, and engaging in discussions with teacher guidance
3. 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

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)

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)

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