



# Science Education for a New Generation

## Framework for K-12 Science Education Fact Sheet

### What is the [Framework for K-12 Science Education](#)?

The Framework is a document that outlines a broad set of expectations for science and engineering education in grades K-12. It is the first of a two-stage process to produce a next generation set of science standards for voluntary adoption by states.

### How was the Framework Developed?

An 18-member committee—including nationally and internationally known practicing scientists, cognitive scientists, science education researchers, and science education standards and policy experts—appointed by the National Research Council of the National Academies of Sciences developed the Framework.

The Framework underwent revisions based on a rigorous peer-review process as well as public scrutiny and feedback before it was finalized.

### Who will use the Framework?

- Developers of the Next Generation Science Standards
- State and District Science Administrators
- Assessment Developers
- Curriculum Designers
- Professional Learning Providers
- Pre-sevice Educators
- Science Educators

### Why Do We Need a Framework?

The Framework is designed to help realize a vision for science and engineering education in which students, over multiple years of school, actively engage in science and engineering practices and apply crosscutting concepts to deepen their understanding of the core ideas in scientific disciplines.

It is important to note, this vision applies to ALL students, not just those who pursue careers in science, engineering, or technology, or those who continue on to higher education.

### How will the Framework Impact Science Education?

- Prepare students for their roles as citizens in a technology rich and scientifically complex world.
- Provide the foundation for the Next Generation Science Standards.
- Lead to the development of related professional development materials, assessments, and curriculum/instructional programs.
- Promote uniformity of science standards across multiple states.
- Raise student understanding of practices of science and engineering.

### Where Can I Find the Framework?

[www.nap.edu/catalog.php?record\\_id=13165](http://www.nap.edu/catalog.php?record_id=13165)

## Three Dimensions of the Framework

The three dimensions of the Framework are presented in separate chapters. However, in order to facilitate students' learning, the dimensions must be woven together in standards, curricula, instruction, and assessments.

<p><b>Science and Engineering Practices</b></p> <ol style="list-style-type: none"> <li>1. Asking Questions and Defining Problems</li> <li>2. Developing and Using Models</li> <li>3. Planning and Carrying Out Investigations</li> <li>4. Analyzing and Interpreting Data</li> <li>5. Using Mathematics and Computational Thinking</li> <li>6. Constructing Explanations and Designing Solutions</li> <li>7. Engaging in Argument from Evidence</li> <li>8. Obtaining, Evaluating, and Communicating Information</li> </ol>	<p><b>Disciplinary Core Ideas</b></p> <p><u>Physical Sciences</u></p> <p>PS 1: Matter and Its Interactions          PS 2: Motion and Stability: Forces and Interactions          PS 3: Energy          PS 4: Waves and Their Applications in Technologies for Information Transfer</p> <p><u>Life Sciences</u></p> <p>LS 1: From Molecules to Organisms: Structures and Processes          LS 2: Ecosystems: Interactions, Energy, and Dynamics          LS 3: Heredity: Inheritance and Variation of Traits          LS 4: Biological Evolution: Unity and Diversity</p> <p><u>Earth and Space Sciences</u></p> <p>ESS 1: Earth's Place in the Universe          ESS 2: Earth's Systems          ESS 3: Earth and Human Activity</p> <p><u>Engineering, Technology, and the Applications of Science</u></p> <p>ETS 1: Engineering Design          ETS 2: Links Among Engineering, Technology, Science and Society</p>
<p><b>Crosscutting Concepts</b></p> <p><i>These concepts unify the study of science and engineering through their common application across fields.</i></p> <ol style="list-style-type: none"> <li>1. Patterns</li> <li>2. Cause and Effect</li> <li>3. Scale, Proportion and Quantity</li> <li>4. Systems and System Models</li> <li>5. Energy and Matter</li> <li>6. Structure and Function</li> <li>7. Stability and Change</li> </ol>	