NEXT GENERATION SCIENCE STANDARDS

Changes in Science for Administrators: CCSS, STEM, and NGSS

Introduction

This guide explores the shifts in science education that have resulted from the development of the Common Core State Standards (CCSS), STEM, and the Next Generation Science Standards (NGSS). These initiatives are set to prepare students for college and career readiness.

Common Core State Standards

The Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects identify the literacy skills required for college and career readiness. The CCSS call for scientific investigations that promote reading to learn and reflective writing. Students must assess reasoning, evaluate data, construct arguments, and cite evidence.

COMMON CORE
STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER

For example, students might construct written explanations as they investigate nature and engage in reading to further develop conceptual understanding.

STEM

The U.S. Government developed the STEM initiative to raise awareness of the importance of STEM fields in the global economy. Encouraging these fields of study through authentic, real-world application promotes student interest and understanding in all subjects. Students can apply science and math learning as they engage with engineering and technology tasks.

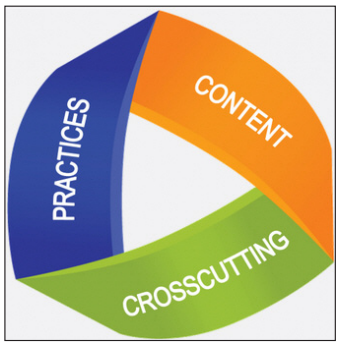
STEM
SCIENCE | TECHNOLOGY | ENGINEERING | MATHEMATICS

For example, consider asking to engineer a new shoe tread. The students would learn science concepts—such as friction, using computers to create designs, and using mathematics and graphing to explore the relationships among surface area, friction, and mass.

Next Generation Science Standards

The NGSS create a set of rich science learning expectations that develop and deepen over time. Students learn how science and engineering pertain to real-world problems, preparing them for college and career.

The standards shift the science classroom from brief coverage of many topics to deep understanding of key ideas. To achieve this, the NGSS framework is based on three interrelated dimensions: science and engineering practices, crosscutting concepts, and disciplinary core ideas.



Science and Engineering Practices

Science and engineering practices include asking questions, defining problems, developing models, interpreting data, constructing explanations, and engaging in argument based on evidence.

The purpose of these practices is to establish and apply behaviors of scientists and practices of engineers, thus extending the driving purpose of scientific inquiry and engineering design.

By strengthening students' understanding of the relevance of the STEM fields, they can see how scientists and engineers solve challenges in society and make the connections to these concepts in their everyday lives.

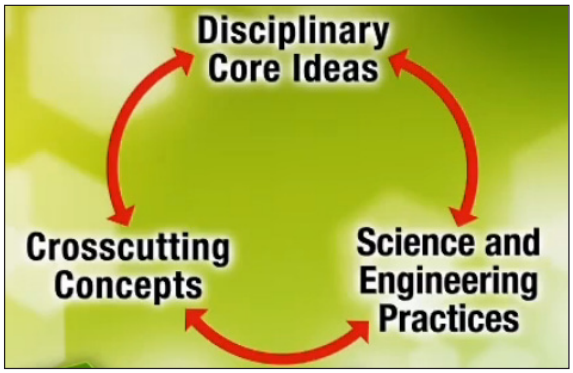
Crosscutting Concepts

Crosscutting concepts are ideas that span science and engineering. Some examples include patterns, cause and effect, scale, system models, cycles, stability, and change.

These concepts—as developed in the framework—provide explicit instructional support to connect their knowledge across science fields and contexts.

Disciplinary Core Ideas

The NGSS identify disciplinary core ideas and make explicit how science and engineering practices and crosscutting concepts relate to particular core ideas.



Disciplinary core ideas unite the K–12 science curriculum across four domains: the physical sciences; the life sciences; the earth and space sciences; and engineering, technology, and applications of science.

Review

This guide explored the shifts in science education that have resulted from the development of the CCSS, STEM, and the NGSS.