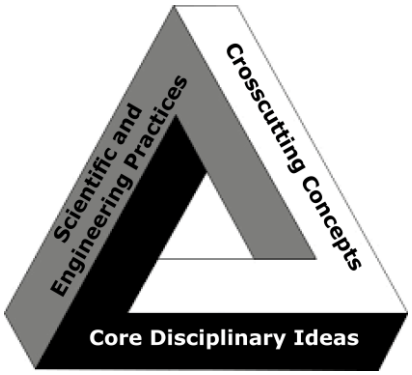
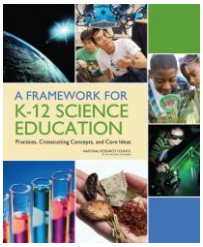
Reference List of Academic Standards

The MISF STEM Advisory Committee encourages schools to incorporate Science & Engineering Practices and Crosscutting Concepts, as applicable, from *A Framework for K-12 Science Education*, the foundation on which the Next Generation Science Standards (NGSS) and Minnesota's new science standards built.

The *Framework* recommends that science education in grades K-12 be built around three key dimensions:

1. **Scientific & Engineering Practices**, including asking questions, defining problems, using mathematics, developing models, etc.
2. **Crosscutting Concepts** that unify the study of science and engineering, including patterns, cause and effect, scale, proportion and quantity, etc.
3. **Disciplinary Core Ideas** from the following four areas: physical sciences; life sciences; earth and space sciences; and engineering, technology, and applications of science.





A Framework for K-12 Science Education, published by the National Research Council (2012), is available for download at:

www.nap.edu/catalog/13165/a-framework-for-k-12-science-education-practices-crosscutting-concepts

The Next Generation Science Standards (NGSS) are available at: www.nextgenscience.org

Science & Engineering practices:
http://nstahosted.org/pdfs/ngss/resources/201112_framework-bybee.pdf
Crosscutting Concepts:
http://nstahosted.org/pdfs/ngss/MatrixOfCrosscuttingConcepts.pdf

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The **Minnesota Academic Standards for Mathematics** (2007) and the **Minnesota Academic Standards for Science** (2009) and supporting information can be found on the SciMathMN Minnesota STEM Teacher Center website: www.scimathmn.org/stemtc/standards.

Information about the MN science standards review process can be found at: https://education.mn.gov/MDE/dse/stds/sci/. The commissioner-approved draft of the standards can be found at the bottom of the above web page.

The International Technology and Engineering Educators Association (ITEEA) Standards for Technological Literacy: Content for the Study of Technology are available at: https://www.iteea.org/Publications/StandardsOverview.aspx

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The **Framework for 21st Century Learning** defines skills and knowledge students need to succeed in work, life and citizenship. See http://www.p21.org/about-us/p21-framework.