Key Instructional Shifts

Nebraska's 2024 College and Career Ready Standards for Science

Shifting instructional practice to meet the demands of college and career-ready standards is central to improving teaching and learning. Nebraska's College and Career Ready Standards for Science (2017 and 2024) require several key shifts in practice so that phenomena-based three-dimensional science learning comes to life in the classroom. These important shifts, along with thoughtful consideration of curricular materials, are essential in realizing the vision of excellent science instruction. This document provides an overview of the key instructional shifts for science and the roles that teachers, students, and school leaders have in their implementation.

Shift 1: Apply three-dimensional teaching and learning to science instruction.

The **Disciplinary Core Ideas** are the focused, limited set of science ideas necessary for ALL students to achieve scientific literacy. The **Disciplinary Core Ideas**, **Science and Engineering Practices**, and **Crosscutting Concepts** each build coherently K-12 to allow for deeper understanding of science concepts. When the three dimensions are integrated, students gain contextual understanding of how science knowledge is acquired and applied, and how science is connected through a series of concepts, rather than memorizing facts devoid of context.

Teachers…	School leaders…	Students…
■ Engage students with Disciplinary Core Ideas and Integrate Science and Engineering Practices with Crosscutting Concepts ■ Support students in applying knowledge to real-world contexts ■ Evaluate students' contextual application of knowledge beyond memorization	■ Lead the alignment of a district-wide vision for excellent science instruction reflecting the state science vision ■ Promote educator collaboration to create cohesive learning experiences ■ Ensure phenomena based three-dimensional learning at all grade levels ■ Allocate resources to materials and support for effective three-dimensional science instruction.	■ Investigate and make sense of phenomena and solve problems ■ Engage daily in lessons integrating Disciplinary Core Ideas, Science and Engineering Practices, and Crosscutting Concepts ■ Ask questions and participate in discussions to deepen scientific understanding ■ Identify how the three-dimensions of science are connected.

Shift 2: Connect ideas across science domains by explaining natural phenomena and designing solutions to real-world challenges.

The **Crosscutting Concepts** are used to organize and make sense of **Disciplinary Core Ideas**. They serve as tools that bridge domain boundaries and deepen understanding of content. The **Crosscutting Concepts** provide structure for synthesizing knowledge from various fields into a coherent and scientifically based view of the world as students explain natural phenomena and design solutions using the **Science and Engineering Practices**. Natural phenomena serve as the context for the work of both scientists and engineers. In this context, science, engineering, and technology are integrated in instruction; empowering students to apply learning to their everyday lives.

Teachers…	School leaders…	Students…
■ Encourage inquiry through the exploration of real-world phenomena ■ Guide synthesis of knowledge using Crosscutting Concepts for problem-solving ■ Integrate engineering and technology to highlight science's everyday relevance ■ Foster collaboration in designing solutions to real-world challenges	■ Support inquiry-based learning for real-world analysis ■ Partner with local organizations for authentic experiences ■ Evaluate instructional strategies that connect science concepts ■ Advocate for quality instruction and materials	■ Use Disciplinary Core Ideas and Crosscutting Concepts to explain phenomena across science ■ Investigate phenomena to solve real-world problems ■ Engage in hands-on investigations integrating science, engineering, and technology ■ Participate in community research, collecting data for real-world studies

Shift 3: Use overlapping skills to investigate, evaluate, and reason scientifically across disciplines.

The **Science and Engineering Practices** are used by students to demonstrate understanding of the **Disciplinary Core Ideas** and **Crosscutting Concepts.** The **Science and Engineering Practices** connect science with mathematics, English Language Arts, and other disciplines through meaningful and substantive overlapping skills and knowledge. This affords all students equitable access to learning and ensures all students are prepared for college, career, and citizenship.

Teachers…	School leaders…	Students…
■ Implement inquiry-based lessons integrating science, math, ELA, and social studies ■ Foster a classroom that prioritizes student discourse and collaboration. ■ Use high-quality texts to promote disciplinary literacy ■ Employ assessments that integrate knowledge from multiple areas	■ Advocate for a curriculum that features three-dimensional instruction. ■ Support authentic assessments reflecting real-world skills ■ Provide professional development on disciplinary literacy and student discourse ■ Ensure equitable access to diverse resources for interdisciplinary learning	■ Engage in discussions using scientific reasoning and knowledge from math and ELA ■ Collaborate on interdisciplinary activities applying integrated skills ■ Demonstrate connections among science, math, and ELA in discourse ■ Seek resources to enhance scientific literacy across content areas