WISCONSIN STANDARDS for

Technology and Engineering

Wisconsin Department of Public Instruction
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Madison, Wisconsin

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Section I

Wisconsin's Approach to Academic Standards

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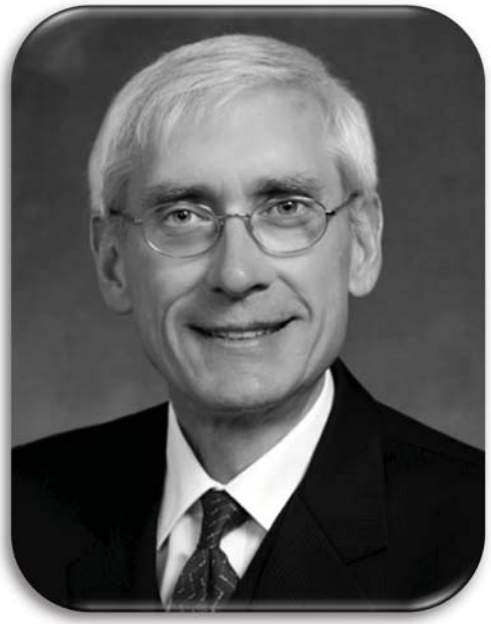
Foreword



Career and Technical Education (CTE) has significant value for all students – from introducing them to the world of work to providing specific technical skills. CTE helps students to find relevance, application and understanding of the core subjects.

Career and Technical Education needs to be recognized for the numerous ways it adds value to our students' education and success. As we strive to prepare every Wisconsin student to be college and career ready, it is CTE that provides our greatest opportunity for creating a skilled, knowledgeable and productive future workforce. CTE programs are critical for a student to develop contemporary knowledge and skills for the world of work or for postsecondary coursework. In many schools, CTE also provides articulated courses and work-based learning opportunities, as well as Career and Technical Student Organization connections for students.

To clearly identify what students should know and be able to demonstrate as productive workers, the Wisconsin Department of Public Instruction created the **Wisconsin Standards for Technology and Engineering**. This resource provides a framework for aligning technology and engineering curriculum, instruction and assessment.

The standards within this resource will strengthen CTE's multiple pathways for students to become college and career ready while still in high school. We need to ensure students are exposed to a variety of career development experiences from kindergarten through 12th grade. By adopting the standards within this resource, technology and engineering programs will continue offering relevant, rigorous and authentic learning experiences that meet the students' needs and future ambitions. Career and Technical Education should be part of any comprehensive effort to improve student achievement and success while preparing college and career ready graduates. This continued commitment has great economic implications for our future!

Tony Evers, PhD
State Superintendent

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Thanks to the many staff members across the division and other teams at DPI who have also contributed their time and talent to this project.

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Purpose of the Document

Career and Technical Education (CTE) programs include planned courses of high-quality academic content and technical competencies and skills which focus on programs of study and prepare students for successful college and career readiness.

The aim of this guide is to improve CTE for students and for communities. To assist Wisconsin educators and stakeholders in understanding and implementing the **Wisconsin Standards for Career and Technical Education**, the Wisconsin Department of Public Instruction (DPI) has developed standards in the areas of Agriculture, Food and Natural Resources; Business and Information Technology; Family and Consumer Sciences; Health Science; Marketing, Management and Entrepreneurship; and Technology and Engineering. These materials are intended to provide direction in the development of course offerings and curriculum in school districts across Wisconsin.

This publication provides a vision for student success and guiding principles for teaching and learning. Program leaders will find the guide valuable for making decisions about:

- program structure and integration;
- curriculum redesign;
- staffing and staff development;
- scheduling and student grouping;
- facility organization;
- learning spaces and materials development;
- resource allocation and accountability; and
- collaborative work with other units of the school, district and community.

A Guide to Wisconsin Career and Technical Education & Technology and Engineering Education

Wisconsin Career and Technical Education (CTE) programs (Agriculture, Food and Natural Resources; Business and Information Technology; Family and Consumer Sciences; Health Sciences; Marketing, Management and Entrepreneurship; and Technology and Engineering) have a rich history and foundation of preparing young adults for the next steps in their lives—postsecondary education and the world of work. Through ties to business, industry and community, CTE programs provide perspectives and partnerships necessary to educate the entire student. Along with CTE's relationships, the standards outlined in this document set a new direction for the knowledge and skills necessary for successful transition to postsecondary programs leading to and/or direct entry into high-wage, high-demand and highly skilled careers. When paired with the Common Core State Standards, Wisconsin students now have access to increasingly rigorous and relevant content to ensure college and career readiness.

Each set of Career and Technical Education standards contains two distinct sections:

1. **Wisconsin Common Career Technical Standards**
2. Standards for the specific discipline

The Shift from Model Academic Standards (1998) to State Standards (2013)

The Model Academic Standards published in 1998 were developed in such a way as to highlight what every student should know and be able to do in a particular content area by the end of grade 4, 8 or 12. In focusing on every student, these standards did not necessarily lend themselves to providing a proficiency level or mastery of industry expectations in a specific career pathway particularly for the purpose of career and technical education.

This new set of standards provides CTE programs an opportunity to develop a single course for exploring a career pathway; as well as developing programs and pathways which include a sequence of courses that have an expectation of proficiency and mastery of skills for students who concentrate in CTE. These standards also serve as a framework to align existing course content to identify gaps and inform curricular decisions. However, the full scope of a set of standards should not be used as a measure of a course or program's completeness. Rather, distinctive conversations and informed decisions with involvement of multiple stakeholders, including business/industry and postsecondary representation, should be made regarding what is and what is not covered in a course, a sequence of courses or a program. Where one district may focus, due to local and community needs or other influences, on a single pathway, another may fully develop multiple pathways. These standards provide a foundation for a variety of applications in each of Wisconsin's districts.

The standards also shift from looking at knowledge and skills acquired by the end of certain grade levels to grade bands of knowledge and skills that should be acquired during a student's route through each level of their education. Grade bands of PK-5, 6-8 and 9-12 align to typical elementary, middle and high school levels.

- Grade band PK-5 performance indicators represent knowledge and skills that should be integrated throughout the elementary curriculum. Licensed career and technical education teachers in districts are an excellent resource to assist in the development of curriculum and activities.
- Career and technical education should be part of the core curriculum for all middle school students. Awareness, exploration and building foundational skills for career pathways occur in middle school. The performance indicators in grade band 6-8 showcase these foundational Skills with an emphasis on career development.
- Career and technical education at the high school level must go beyond awareness and exploration. Students should be developing specific knowledge and skills that are transferrable to other coursework, a job-site or postsecondary options. Performance indicators for grades 9-12 align specifically to industry standards and expectations for career clusters and pathways.

Wisconsin Common Career Technical Standards
In working with business, industry and education professionals from around the state in the development of standards for each of the individual CTE areas, discussions around common elements, skills, knowledge and dispositions led to the identification of a set of **Wisconsin Common Career Technical Standards**. At relatively the same time, national level conversations were also taking place. As part of the Common Career and Technical Core outlined by the National Association of State Directors of Career and Technical Education Consortium (NASDCTEc), a set of Career Ready Practices emerged. These Career Ready Practices can easily be seen within the **Wisconsin Common Career Technical Standards**.

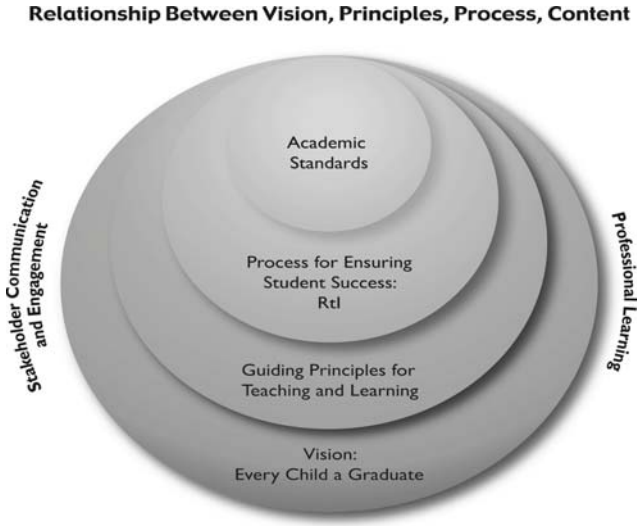
Standards for Technology and Engineering
The learning priorities and performance indicators contained within each set of discipline standards consists of knowledge and skills specific to the respective disciplines and their related jobs and careers. These are, of course, critical as students develop and pursue their career goals.

The educators and stakeholders writing the **Wisconsin Standards for Technology and Engineering** took direction from many resources including, but not limited to:

- Career Clusters Knowledge and Skill Statements
- International Technology and Engineering Education Association Standards for Technological Literacy
- Electronics Technicians Association Standards
- Florida Department of Education Curriculum Framework
- Renewable Energy in Building Science Conceptual Framework
- KEEP Energy Education Conceptual Framework
- National Automotive Technicians Educational Foundation (NATEF)
- Woodwork Career Alliance
- SkillsUSA Competencies and Skills

Aligning for Student Success

To build and sustain schools that support every student in achieving success, educators must work together with families, community members and business partners to connect the most promising practices in the most meaningful contexts. Currently, statewide initiatives focus on high school graduation, Response to Intervention (RtI) and the *Common Core State Standards for English Language Arts, Disciplinary Literacy and Mathematics*. Now the release of the **Wisconsin Standards for Career and Technical Education** brings to light another set of important academic standards for school districts to implement. While these initiatives are often viewed as separate efforts, each of them is connected to a larger vision of every child graduating college and career ready. The graphic below illustrates how these initiatives function together for a common purpose. Here, the vision and set of guiding principles form the foundation for building a supportive process for teaching and learning rigorous and relevant content. The following sections articulate this integrated approach to increasing student success in Wisconsin schools and communities.



A Vision: Every Child a Graduate

In Wisconsin, we are committed to ensuring every child is a graduate who has successfully completed a rigorous, meaningful, 21st century education that will prepare him or her for careers, college and citizenship. Though the public education system continues to earn nation-leading graduation rates, a fact we can be proud of, one in ten students drop out of school, achievement gaps are too large and overall achievement could be even higher. This vision for every child a graduate guides our beliefs and approaches to education in Wisconsin.

Guided By Principles

All educational initiatives are guided and impacted by important and often unstated attitudes or principles for teaching and learning. *The Guiding Principles for Teaching and Learning* emerge from research and provide the touchstone for practices that truly affect the vision of every child a graduate prepared for college and career. When made transparent, these principles inform what happens in the classroom, direct the implementation and evaluation of programs and most importantly, remind us of our own beliefs and expectations for students.

Ensuring a Process for Student Success

To ensure that every child in Wisconsin graduates prepared for college and career, schools need to provide high quality instruction, balanced assessment and collaboration reflective of culturally responsive practices. The Wisconsin Response to Intervention (RtI) framework helps to organize the components of a system designed to support student learning. Below, the three essential elements of high quality instruction, balanced assessment and collaboration interact within a multi-level system of support to ensure each student receives what he or she needs to access higher levels of academic and behavioral success.

At the school or district level, programs, initiatives and practices related to high quality instruction, balanced assessment and collaboration can be more powerful when organized or braided to function systemically to support all students. The focus must be on a comprehensive approach to student learning.

Connecting to Content: The Common Core State Standards

Within this vision for increased student success, rigorous, internationally benchmarked academic standards provide the content for high quality curriculum and instruction and for a balanced assessment system aligned to those standards. With the adoption of the CCSS, Wisconsin has the tools to build world-class curriculum, instruction and assessments for greater student learning. The CCSS articulate what we teach so that educators can focus on how instruction can best meet the needs of each student. When implemented within a multi-level system of support, the CCSS can help to ensure that every child will graduate prepared for college, work and a meaningful life.

Wisconsin's Vision for RtI

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