

Career and Technical Education Standards

Second Edition

for teachers of students ages 11–18+

■ For additional information go to www.boardcertifiedteachers.org

*National Board Certification
Promotes Better Teaching,
Better Learning, Better Schools*

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Table of Contents

Preface	4
About the National Board for Professional Teaching Standards	4
About the Standards	6
About Certification	7
Foundation of National Board Certification for Teachers	8
Five Core Propositions	8
Architecture of Accomplished Teaching	11
Standards	12
Introduction	12
Career and Technical Education Standards Statements	18
Standard I: Knowledge of Students	20
Standard II: Responding to Diversity	25
Standard III: Knowledge of Content	29
Standard IV: Learning Environments and Instructional Practices	51
Standard V: Assessment	60
Standard VI: Postsecondary Readiness	65
Standard VII: Program Design and Management	69
Standard VIII: Partnerships and Collaborations	73
Standard IX: Leadership in the Profession	79
Standard X: Reflective Practice	84
Standards Committees	90
Acknowledgments	92

Preface

About the National Board for Professional Teaching Standards

The National Board for Professional Teaching Standards (National Board) is a not-for-profit professional organization, created and governed by practicing teachers and their advocates. The founding mission of the National Board is to advance the quality of teaching and learning by

- maintaining high and rigorous standards for what accomplished teachers should know and be able to do;
- providing a national voluntary system certifying teachers who meet these standards; and
- advocating related education reforms to integrate National Board Certification into American education and to capitalize on the expertise of National Board Certified Teachers.

Recognized as the “gold standard” in teacher certification, the National Board believes higher standards for teachers means better learning for students.

Founded in 1987, the National Board began by engaging teachers in the development of standards for accomplished teaching and in the building of an assessment—National Board Certification—that validly and reliably identifies when a teacher meets those standards. Today, there are 25 certificate areas that span 16 content areas and four student developmental levels. The essence of the National Board’s vision of accomplished teaching is captured in the enduring document *What Teachers Should Know and Be Able to Do*, at the heart of which are the Five Core Propositions:

1. Teachers are committed to students and their learning.
2. Teachers know the subjects they teach and how to teach those subjects to students.
3. Teachers are responsible for managing and monitoring student learning.
4. Teachers think systematically about their practice and learn from experience.
5. Teachers are members of learning communities.

The National Board believes that board certification should become the norm, not the exception, and should be fully integrated into the fabric of the teaching profession. In other professions, such as medicine, engineering, and architecture, board certification has helped to create a culture of accomplished practice and is a major reason why those professions are held in such high regard by the public. Those professions did what teaching must now do: strengthen the coherent pipeline of preparation that begins in pre-service and continues through board certification and beyond, with each step engineered to help teachers develop toward accomplished. More than 110,000 teachers had achieved board certification by 2014, a number which represents the largest group of identified teaching experts in the country. Given the size of the teaching workforce, however, this sizable number represents fewer than 3 percent of teachers.

For most children that means they go through their entire schooling without being taught by a board-certified teacher. Each teacher who pursues board certification helps to close this gap, strengthening the profession and the quality of teaching and learning. In a world where board certification is the standard that all teachers aspire to and most achieve, students experience accomplished teaching throughout their schooling, unleashing their potential.

About the Standards

Every child deserves an accomplished teacher—one who is qualified to equip students with the skills to succeed in a global community. The core mission of the National Board for Professional Teaching Standards is to create field-specific standards for accomplished teaching that are grounded in the Five Core Propositions and that articulate the actions that accomplished teachers employ to advance student learning. Each standards document represents a professional consensus on the attributes of practice that distinguish accomplished teaching in that field. Many school systems use the standards as the basis for ongoing professional development, and many colleges and universities incorporate the standards into their undergraduate and graduate teacher education programs.

Standards are developed and revised by a committee of 12–15 members who are representative of accomplished professionals in their field. A majority of standards committee members are practicing Board certified teachers. Other committee members are experts in academic content and child development, including teacher educators, researchers, and other professionals in the relevant field. Standards are disseminated widely for public comment and subsequently revised as necessary before adoption by the National Board's Board of Directors.

Throughout the development of both the standards and the certification process, the National Board ensures broad representation of the diversity that exists within the profession; engages pertinent disciplinary and specialty associations at key points in the process; collaborates closely with appropriate state agencies, academic institutions, and independent research and education organizations; and establishes procedures to detect and eliminate instances of external and internal bias.

National Board Standards and certifications are defined by the developmental level of the students and by the subject or subjects being taught. Teachers select the subject area that makes up the substantive focus of their teaching. They may choose Generalist certificates if they do not focus on one particular subject area in their practice. The four overlapping student developmental levels (listed below) indicate the age of the majority of their students.

- Early Childhood (EC)—ages 3–8
- Middle Childhood (MC)—ages 7–12
- Early Adolescence (EA)—ages 11–15
- Adolescence and Young Adulthood (AYA)—ages 14–18+

About Certification

National Board Certification® is a voluntary, standards-based process designed for teachers to transform the Five Core Propositions into practice. In order to be eligible for certification a teacher must

- Hold a baccalaureate degree from an accredited institution¹;
- Have a minimum of three years' teaching experience at the early childhood, elementary, middle school, or high school level; and
- Where it is required, hold a state teaching license.

The assessments, aligned with the Five Core Propositions and the standards, are designed so that teachers demonstrate their practice by providing evidence of what they know and do. The evidence-based assessment honors the complexities and demands of teaching.

In 2014, the National Board initiated revision of the assessment to make the process more flexible, affordable, and efficient for teachers. In all certificate areas, candidates for National Board Certification are now required to complete four components: three portfolio entries, which are submitted online, and a computer-based assessment, which is administered at a testing center. Teachers develop portfolio entries that require analysis of their practice as it relates to student learning and to being a reflective, effective practitioner. Designed to capture what a teacher knows and is able to do in real time and in real-life settings, the portfolio consists of description, analysis, and reflection focused on student learning that is captured on video and in student work samples. The process requires teachers to reflect on the underlying assumptions of their practice and the impacts of that practice on student learning.

Teachers also demonstrate content knowledge by responding to open-ended and multiple choice questions delivered at a secure testing site. The assessment center component complements the portfolio, validates that the knowledge and skills exhibited in the portfolio are accurate reflections of what a candidate knows, and provides candidates with opportunities to demonstrate knowledge and skills not sampled in the portfolio.

Assessments are based on the standards and are developed for every certificate area by educators who specialize in the same content and student developmental level as the candidates. Educators who are themselves practitioners in the certificate area score the submitted portfolio entries. They must successfully complete intensive training and qualify for scoring on the basis of their understanding of National Board Standards and scoring guidelines.

¹ Candidates registering for the Career and Technical Education certificate are required to hold a bachelor's degree only if their state required one for their current license.

Foundation of National Board Certification for Teachers

Five Core Propositions

The National Board framework for accomplished teaching was established in its 1989 publication, *What Teachers Should Know and Be Able to Do*. The Five Core Propositions serve as the foundation for all National Board standards and assessments, defining the level of knowledge, skills, abilities, and commitments that accomplished teachers demonstrate. Teachers embody all Five Core Propositions in their practices, drawing on various combinations of these skills, applications, and dispositions to promote student learning.

1. Teachers are committed to students and their learning.

Accomplished teachers base their practice on the fundamental belief that all students can learn and meet high expectations. They treat students equitably, recognizing the individual differences that distinguish one student from another and taking account of these differences in their practice. They adjust their practice based on observation and understanding of their students' interests, abilities, skills, knowledge, language, family circumstances, and peer relationships. They view students' varied backgrounds as diversity that enriches the learning environment for every student.

Accomplished teachers understand how students develop and learn. They consult and incorporate a variety of learning and development theories into their practice, while remaining attuned to their students' individual contexts, cultures, abilities, and circumstances. They are committed to students' cognitive development as well as to students' ownership of their learning. Equally important, they foster students' self-esteem, motivation, character, perseverance, civic responsibility, intellectual risk taking, and respect for others.

2. Teachers know the subjects they teach and how to teach those subjects to students.

Accomplished teachers have a rich understanding of the subject(s) they teach and appreciate how knowledge in their subject is created, organized, linked to other disciplines, and applied to real-world settings. While maintaining the integrity of disciplinary methods, content, and structures of organization, accomplished teachers develop the critical and analytical capacities of their students so they can think for themselves.

Accomplished teachers command specialized knowledge of how to convey and reveal subject matter to students. They are aware of the preconceptions and background knowledge that students typically bring to each subject and draw upon pedagogical and subject matter understandings to anticipate challenges,

modify their practice, and respond to students' needs. They also demonstrate a commitment towards learning about new strategies, instructional resources, and technology that can be of assistance. Their instructional repertoire and professional judgment allow them to generate multiple paths to knowledge in the subjects they teach, and they are adept at teaching students how to pose and solve their own problems so they can continue exploring and advancing their understanding.

3. Teachers are responsible for managing and monitoring student learning.

Accomplished teachers view themselves as facilitators of student learning within dynamic instructional settings. They create, enrich, maintain, and alter learning environments while establishing effective ways to monitor and manage those environments and the student learning that occurs within them. They possess a comprehensive knowledge of instructional methods, know when each is appropriate, and can implement them as needed. They use instructional time constructively and efficiently, customizing physical layout, resources, and instructional methods. They enlist the knowledge and support of a wide range of stakeholders to provide their students with enriched opportunities to learn. They understand the strengths and weaknesses of pedagogical approaches they may take, as well as the suitability of these approaches for particular students.

Accomplished teachers know how to engage students in varied settings and group configurations. They create positive and safe learning environments that guide student behavior and support learning, allowing the schools' goals for students to be met. They are adept at setting norms for social interaction among students and between students and teachers. They understand how to motivate students and value student engagement, supporting them as they face and learn from challenges.

Accomplished teachers assess the progress of individual students as well as that of the class as a whole. They apply their knowledge of assessment to employ multiple methods for measuring student growth and understanding. They use the information they gather from monitoring student learning to inform their practice, and they provide constructive feedback to students and families. They collaborate with students throughout the learning process and help students engage in self-assessment.

4. Teachers think systematically about their practice and learn from experience.

Accomplished teachers possess a professional obligation to become perpetual students of their craft. Committed to reflective learning, they are models of educated persons. They exemplify the virtues they seek to inspire in students—curiosity, honesty, fairness, respect for diversity and appreciation of cultural differences—and the capacities that are prerequisites for intellectual growth: the ability to reason and take multiple perspectives, to be creative and take risks, and to adopt an experimental and problem-solving orientation.

Accomplished teachers draw on their knowledge of human development, subject matter, and instruction, and their understanding of their students to make principled judgments about sound practice. Their decisions are not only grounded in established theories, but also in reason born of experience. They engage in lifelong learning, which they seek to encourage in their students.

Accomplished teachers seek opportunities to cultivate their learning. Striving to strengthen their teaching and positively impact student learning, teachers use feedback and research to critically examine

their practice, seek to expand their repertoire, deepen their knowledge, sharpen their judgment and adapt their teaching to new findings, ideas and theories.

5. Teachers are members of learning communities.

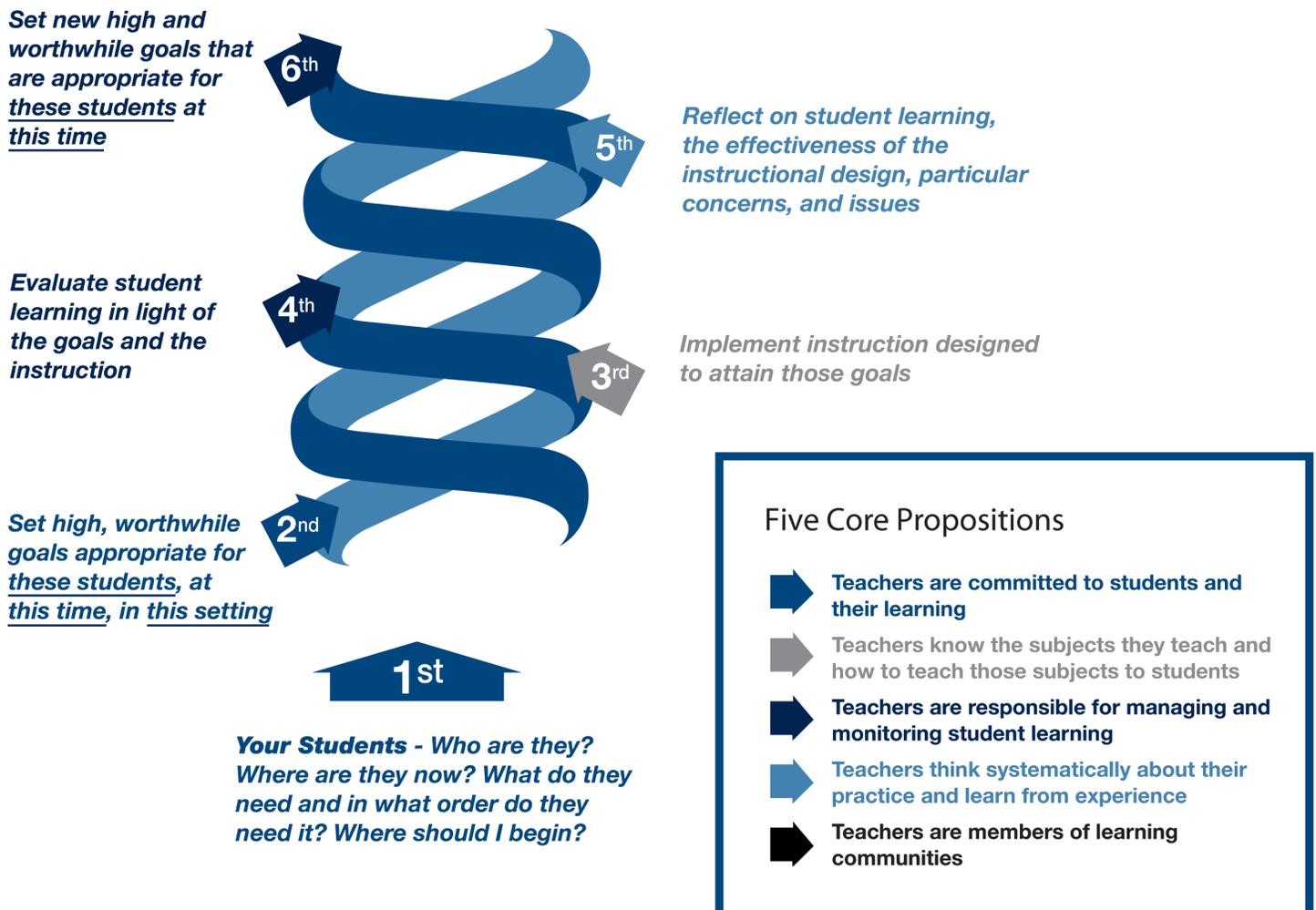
Accomplished teachers participate actively in their learning communities to promote progress and achievement. They contribute to the effectiveness of the school by working collaboratively with other professionals on policy decisions, curriculum development, professional learning, school instructional programs, and other functions that are fundamental to the development of highly productive learning communities. They work collaboratively and creatively with families and the community, engaging them productively in the work of the school and cultivating students' connections with the opportunities, resources, and diversity they afford.

Accomplished teachers can evaluate school progress and the allocation of school resources in light of their understanding of state and local educational objectives and their knowledge of student needs. They are knowledgeable about and can advocate for specialized school and community resources that can be engaged for their students' benefit, and are skilled at employing such resources as needed.

Architecture of Accomplished Teaching

The Architecture of Accomplished Teaching provides a view of how the use of the Five Core Propositions and the standards that are developed from them result in student learning. As depicted in the Architecture of Accomplished Teaching illustration, shown below, one strand represents teaching practice as grounded in the Five Core Propositions, while the other strand represents the teacher’s impact on students and their learning.

The Architecture of Accomplished Teaching: What is underneath the surface?



The National Board program certifies accomplished teachers who positively influence student learning through effective teaching practice. The process includes the core propositions for all teachers, a common set of accomplished teaching standards specific to the content field and students’ developmental levels, and a set of evidence-based assessments specific to the field that certify what accomplished teachers know and do.

Standards

Introduction

From middle through high school, career and technical education (CTE) offers courses of study designed to help students foster their interests and aptitudes in sync with their intellectual, social, and emotional growth. CTE provides students with opportunities to acquire skills, master concepts, and develop strategies for personal and professional success. Applied instruction within work-based learning environments gives students the chance to integrate practical and theoretical knowledge across projects as they prepare for higher education and future careers.

Accomplished CTE teachers help students discover their unique sets of strengths and talents by extending learning environments in meaningful ways. As students advance from the middle to high school level, educators coordinate challenging projects that increasingly take students from the classroom to the lab and beyond. CTE instructors encourage career exploration and facilitate touchstone experiences within their schools and local communities. They also support career and technical student organizations (CTSOs), utilizing CTE-related student groups to enhance instructional competencies in their curricula. Teachers embed CTSO activities within daily instruction and inspire student engagement by promoting co-curricular activities such as leadership conferences, competitive events, field trips, and community service initiatives. Accomplished instructors understand that CTSOs help their students build character, practice teamwork, and grow as individuals to become college and career ready.

Passionate about preparing every student for postsecondary challenges and rewards, accomplished educators meet the diverse needs of their students by learning about and relating to them as individuals. CTE teachers provide each student with quality instruction, supporting a range of exceptional needs, from fundamental English language proficiency to enhancements for the gifted and talented. Accomplished instructors ensure that their students remain fully engaged in the learning environment while treating each other with respect. CTE teachers model and hold their students accountable to the high standards of professionalism and maturity they need to earn postsecondary success.

Why Is CTE Important?

The United States requires a well-educated workforce of skilled graduates. We must think critically, collaborate productively, and innovate fearlessly to strengthen our economy and remain competitive in the global marketplace. The power of ingenuity has long been valued within the American labor force, but the importance of creative problem solving increases rapidly every day. The type of instruction delivered within CTE programs directly addresses the contemporary needs of twenty-first century business and industry.

Accomplished CTE teachers provide their students with relevant, real-world experience that builds critical skill sets while positioning students within cutting-edge careers. CTE instructors help students answer the ubiquitous question, “When am I ever going to use this?” by showing students how they can use

English language arts, history and social studies, mathematics, and science to solve current problems and design future solutions together. CTE curricula combine general academic disciplines within professionally contextualized learning environments that stress the purpose and meaning of education while motivating students to achieve clearly aligned college and career goals. Working with industry partners and other stakeholders, accomplished teachers engage CTE students in dynamic and challenging projects that stimulate their interest and help them mature as thinkers and professionals. Every year, students attain technical qualifications and sustainable employability skills through industry certifications, military service, job internships, and other forms of occupational training. They complete programs in a range of specialty areas, pursue exciting postsecondary opportunities, and make significant contributions to the workforce.

What Is New in This Edition of the CTE Standards?

The first edition of the CTE standards was published in 1997. Since then, career and technical education—and the educational field as a whole—has changed considerably. The second edition of the standards takes these professional developments into consideration while discussing what CTE teachers should know and be able to do.

When framing this conversation, the committee responsible for the second edition made substantial revisions to the structure and organization of the standards. In several instances, the content of two or more standards from the first edition has been addressed within a single standard in the second edition. For example, Standard VI—*Postsecondary Readiness* in the second edition synthesizes and expands the following first edition standards: VII—*Workplace Readiness*, VIII—*Managing and Balancing Multiple Life Roles*, and IX—*Social Development*. The second edition also contains a new standard: VII—*Program Design and Management*. Thirteen standards became ten standards in the current edition of *Career and Technical Education Standards* due to all these modifications.

The content within each standard underwent significant revision. The following list highlights notable shifts in the text.

- ***I—Knowledge of Students***: The committee broadened the standard to consider the understandings that students have of themselves and of their career choices. Here and elsewhere in the standards, the committee also updated language, for example, replacing the word *vocational* to provide fuller descriptions of the academic, technical, and interpersonal knowledge conveyed by accomplished CTE teachers.
- ***II—Responding to Diversity***: In this standard, the committee moved beyond discussing what it means to *accept* diversity and started exploring what it means to *embrace* it. The text addresses how accomplished teachers respond to their own biases while promoting instructional inclusivity and a proactive stance toward individual respect, emotional safety, and global citizenship in the CTE learning environment.
- ***III—Knowledge of Content***: An appreciation of teaching modes and educational content are interwoven within the context of applied instruction. Pedagogical practices are thus never discussed in isolation within the standards and feature prominently in this standard. An understanding of these practices constitutes a body of knowledge related to an appreciation of technical, cross-disciplinary, and transferable skills and concepts. The standard also provides descriptions of the eight new specialty areas for CTE. These areas were refocused to link pedagogy with real-world applications, by adhering to recognized industry nomenclature as well as to business needs and expectations for the twenty-first century.

- *IV—Learning Environments and Instructional Practices*: Classroom settings influence the selection of teaching strategies and are informed by them in turn. This standard explores the nature of this pedagogical dynamic.
- *V—Assessment*: With the increase in legislation mandating educational accountability over the past twenty years, there has been a push to align curricula with state, industry, and national standards. In many instances, standardized assessments accompany these standards. In the last decade, more pressure has been put on CTE teachers to help students meet academic benchmarks. In addition, administering industry-recognized assessments at the end of a CTE course sequence has become a growing trend. This movement holds CTE teachers to a higher level of accountability while better ensuring that their curricula help students meet learning targets. The standards committee thus wrote this standard to demonstrate how an accomplished teacher might recognize the importance of aligning curricula with standards while using curricular resources to their utmost value.
- *VI—Postsecondary Readiness*: In this standard, the committee increased the focus on career exploration (through CTSOs, internships, and so forth) and discussed how accomplished teachers acquire postsecondary information for their students. The committee also expanded the standard to address the pursuit of both educational and professional opportunities.
- *VII—Program Design and Management*: Accomplished teachers understand that the design and management of their learning environments extends to the program level. This standard analyzes the role that accomplished teachers play in CTE program evaluation, from needs assessment and collaboration with stakeholders to CTSO advising, data-based decision making, and strategies for fiscal and curricular sustainability.
- *VIII—Partnerships and Collaborations*: The standard describes how accomplished teachers work with family, education, and business partners to strengthen student support networks and develop career opportunities by extending CTE programs into communities.
- *IX—Leadership in the Profession*: In this standard, the committee discussed practices that distinguish CTE teachers as leaders in their profession. These practices include securing program resources, collaborating with educators across disciplines to enhance learning opportunities, engaging in professional learning communities, participating in professional and industry organizations and projects, mentoring novice colleagues, and advocating for CTE programs and professionals.
- *X—Reflective Practice*: Reflection is a cyclical process that extends beyond the classroom, taking place before, during, and after teaching. In this standard, the committee used examples to demonstrate the many ways that accomplished teachers undertake this highly analytical and individualized process.

What Inspired the Development of Eight New Specialty Areas?

The committee responsible for the second edition of the standards created eight specialty areas to accommodate the diverse industries represented by career and technical education. Committee members began by evaluating the emphases of the previous specialty areas and deconstructing their design. The specialty areas in the first edition were Agriculture and Environmental Sciences; Arts and Communications; Business, Marketing, Information Management, and Entrepreneurship; Family and Consumer Sciences; Health Services; Human Services; Manufacturing and Engineering Technology; and Technology Education. Guided by two principles, the committee then defined a new set of specialty areas.

First, the committee recognized that the new specialty areas should reflect the needs, requirements, and expectations of twenty-first century industry as closely as possible. To this end, committee members studied frameworks developed or endorsed by various CTE stakeholder groups, including the U.S. Department of Labor (USDOL), the Association for Career and Technical Education (ACTE), the Southern Regional Education Board (SREB), and the National Association of State Directors of Career and Technical Education Consortium (NASDCTEc). The committee used the schemata to identify major economic sectors, contextualize industry trends, and align the specialty areas with the labor market. Examining the frameworks side by side, committee members formed specialty areas that promote a balance among stakeholder systems while accommodating a broad range of CTE instructional expertise and professional practice. The specialty areas thus refrain from singling out educational initiatives such as science, technology, engineering, and mathematics (STEM) or family and consumer science (FCS), which are relevant to teachers and students across technical fields. In response to the demands of the modern labor market, STEM skills and concepts are embedded within most specialty areas, FCS in some areas, and a combination of both in other areas.

Second, the committee understood that the new specialty areas need to accommodate the organizational structure of different CTE programs and support the numerous pedagogical and professional affiliations of CTE teachers. Each specialty area establishes broad parameters for CTE teachers due to the variance among certification requirements nationwide. In all instances, CTE teachers should make their National Board certification decisions on the basis of their professional emphases.

Some teachers previously grouped together may now find themselves in different areas. For example, FCS instructors who teach culinary arts or hospitality will find themselves in Leisure and Recreation Services while those instructors who teach food and nutrition, child development, or teacher preparation are now in Community Services and those instructors who teach interior design or apparel design and construction are now in Decorative Arts and Design. In these and other instances, cross-disciplinary themes were used to help teachers identify their fields of expertise within the new specialty areas. Some CTE teachers may also find themselves in multiple areas due to the overlapping nature of professional interests. For instance, sports management teachers may find themselves in Business, Marketing, and Financial Services and in Leisure and Recreation Services. Similarly, those CTE teachers working in energy and power may identify with Engineering, Design, and Fabrication and with Natural Resources; those specializing in floral arrangement may identify with Decorative Arts and Design and with Natural Resources; those teaching marketing and entrepreneurship may find themselves in Business, Marketing, and Financial Services and in Leisure and Recreation Services; and those teaching veterinary science may find themselves in Community Services and in Natural Resources. Other CTE teachers may find themselves within a CTE specialty area and a completely different National Board certificate area. For example, theatre professionals may identify with Information Systems and Technology, Communications, and the Arts in CTE or with the English language arts certificate area, just as some engineering teachers may identify with Engineering, Design, and Fabrication in CTE or with the science certificate area. For a detailed description of the new specialty areas, see [Standard III—Knowledge of Content](#).

A Final Note

The committee responsible for the second edition of these standards strived to support and inspire CTE teachers by characterizing accomplished practice without being prescriptive or reductive. Throughout the standards, educators will find descriptions of teaching strategies that differ in their approach while reinforcing the essential tenets of CTE—namely, the vital importance of integrating all aspects of CTE within applied

instruction, from the fusion of cross-disciplinary, technical, and employability skills to the combination of pedagogical practice with real-world application. The synergy that thrives within challenging, creative CTE learning environments motivates students and prepares them for postsecondary success. The committee presents the second edition of the CTE standards to uphold and advance this fundamental goal.

Developing High and Rigorous Standards for Accomplished Practice

Career and Technical Education Standards, Second Edition describes what accomplished teachers should know and be able to do. The standards are meant to reflect the current professional consensus about the essential aspects of accomplished practice. The deliberations of the Career and Technical Education Standards Committee were informed by various national and state initiatives on student and teacher standards that have been operating concurrently with the development of National Board Standards. As the understanding of teaching and learning continues to evolve over the next several years, these standards will be updated again.

An essential tension of describing accomplished practice concerns the difference between the analysis of teaching and the practice of teaching. The former tends to fragment the profession into any number of discrete duties, such as designing learning activities, providing quality explanation, modeling, managing the classroom, and monitoring student progress. Teaching as it actually occurs, on the other hand, is a seamless activity.

Everything an accomplished teacher knows through study, research, and experience is brought to bear daily in the classroom through innumerable decisions that shape learning. Teaching frequently requires balancing the demands of several important educational goals. It depends on accurate observations of particular students and settings, and it is subject to revision on the basis of continuing developments in the classroom.

The paradox, then, is that any attempt to write standards that dissect what accomplished teachers know and are able to do will misrepresent, to a certain extent, the holistic nature of how teaching actually takes place. Nevertheless, the fact remains: certain identifiable commonalities characterize the practice of accomplished teachers. The standards that follow are designed to capture the knowledge, artistry, proficiency, and understandings—both deep and broad—that contribute to the complex work that is accomplished teaching.

The Standards Format

Accomplished teaching appears in many different forms, and it should be acknowledged at the outset that these specific standards are not the only way it could have been described. No linearity, atomization, or hierarchy is implied in this vision of accomplished teaching nor is each standard of equal weight. Rather, the standards are presented as aspects of teaching that are analytically separate for the purposes of this standards document but that are not discrete when they appear in practice.

Standard Statement: This is a succinct statement of one vital aspect of the practice of the accomplished CTE teacher. Each standard is expressed in terms of observable teacher actions that have an impact on students.

Elaboration: This passage provides a context for the standard, along with an explanation of what teachers need to know, value, and do if they are to fulfill the standard. The elaboration includes descriptions of teacher dispositions toward students, their distinctive roles and responsibilities, and their stances on a range of ethical and intellectual issues that regularly confront them.

In addition, throughout the standards are examples illustrating accomplished practice and demonstrating how decisions integrate various individual considerations and cut across the standards document. If the standards pull apart accomplished teaching into discrete elements, the examples put them back together in ways more clearly recognizable to teachers. Because the National Board believes there is no single right way to teach students, these examples are meant to encourage teachers to reflect on and demonstrate their own accomplished practices.

Career and Technical Education Standards Statements

The National Board for Professional Teaching Standards has organized the standards for accomplished teachers of Career and Technical Education (CTE) into the following ten standards. These standards have been ordered to facilitate understanding, not to assign priorities. They each describe an important facet of accomplished teaching and often occur concurrently because of the seamless quality of accomplished practice. These standards serve as the basis for National Board Certification in CTE.

Standard I: Knowledge of Students

Accomplished teachers have a rich, holistic understanding of who their students are as learners and individuals. They value their students' various learning styles and stages of development, and they create learning environments that differentiate instruction to meet the diverse needs of all students.

Standard II: Responding to Diversity

Accomplished teachers create learning environments characterized by fairness, equity, and a respect for diversity. They use inclusive teaching practices and advocate to ensure that all students receive a quality career and technical education.

Standard III: Knowledge of Content

Accomplished teachers utilize their technical and professional knowledge as well as their interdisciplinary and pedagogical skills to develop curricular objectives, design instruction, promote student learning, and facilitate student success within industry.

Standard IV: Learning Environments and Instructional Practices

Accomplished teachers design contextualized learning environments that foster critical thinking, creativity, leadership, teamwork, and communication skills while preparing students for postsecondary education and careers.

Standard V: Assessment

Accomplished teachers design and implement a variety of valid and reliable assessments that allow students to provide an authentic demonstration of their knowledge and skills and help them establish goals to guide their technical and professional development.

Standard VI: Postsecondary Readiness

Accomplished teachers facilitate career exploration and promote the acquisition of knowledge and skills so students can make informed career decisions that match their interests and aptitudes with the needs, expectations, and requirements of industry.

Standard VII: Program Design and Management

Accomplished teachers design and promote quality programs aligned with industry demands. They manage materials and resources to enrich their programs and sustain meaningful educational experiences for their students.

Standard VIII: Partnerships and Collaborations

Accomplished teachers collaborate with family, education, industry, and community partners to create challenging real-world opportunities and support networks that help students plan, develop, and achieve their career goals.

Standard IX: Leadership in the Profession

Accomplished teachers collaborate with stakeholders within their schools and communities to improve instruction, promote student learning, and advocate for their fields of expertise in education and related industries.

Standard X: Reflective Practice

Accomplished teachers reflect analytically throughout the instructional process, using multifaceted feedback to increase the efficacy of their teaching, strengthen its impact on student development, and model the significance of life-long learning.

Standard I

Knowledge of Students

Accomplished teachers have a rich, holistic understanding of who their students are as learners and individuals. They value their students' various learning styles and stages of development, and they create learning environments that differentiate instruction to meet the diverse needs of all students.

The career and technical education (CTE) learning environment, like the world of work, is a complex social organism, with a range of projects and activities competing for the attention of people with diverse needs, interests, and goals. Whether instruction is individualized, organized around teams, or focused on the class as whole, accomplished CTE teachers engage each student personally with the work at hand while nurturing everyone's curiosity.¹ Instructors do so to ensure that students gain substantial knowledge and receive the best possible education in preparation for the postsecondary challenges they will face. To accomplish these objectives, educators must know their students well. Without an intimate understanding of the factors that affect student performance and behavior, it would be impossible to support students effectively.

Dedicated to meeting the needs of all their students, accomplished CTE instructors learn as much as they can about them and apply this knowledge in the classroom and lab. Teachers study the qualities and characteristics of their students, assess student motivations, and employ an understanding of human development to personalize instruction for each student and promote the well-being of all learners. Accomplished teachers understand that they must be sensitive to student needs as they arise in various ways throughout the classroom. CTE instructors are committed to differentiating their instruction and utilizing their resources to meet the needs of every student, not only those formally identified as having exceptional needs. Teachers know that the education of every student must be individualized to help all students achieve success and realize their highest potential. Accomplished CTE teachers help all their students plot a path to the future so students can advance their academic knowledge, improve their technical skills, develop self-awareness, and prepare themselves for a competitive global workplace.

¹ All references to teachers, educators, and instructors in this document, whether stated explicitly or not, refer to accomplished career and technical education (CTE) teachers.

Obtaining a Holistic View of Students

Accomplished CTE teachers learn about the diversity of their students in all its aspects. A thorough knowledge of students encompasses an understanding of their personal temperaments and emotional needs; physical and intellectual abilities; educational, cultural, and family backgrounds; socioeconomic status; social identity; and career and personal ambitions.¹ By learning about these characteristics, teachers demonstrate respect for their students and create opportunities for meaningful communication with them. (See [Standard II—Responding to Diversity](#).) Educators know that purposeful, appropriate instruction can only take place when it is individualized, and they understand the vital importance of basing their teaching strategies on a rich, holistic understanding of their students. For instance, a health science instructor, aware that a student in her class has a parent incarcerated for drug possession, might lead a class discussion about drug abuse in a tactful manner to avoid offending or upsetting the student. Alternatively, a performing arts instructor, knowing that a student identifies with the opposite gender and presents as such, might select a play that allows the student to audition for roles representing the gender with which the student identifies. Approaches like these make students feel accepted and build their trust, which allows teachers to help them develop opportunities for success.

Accomplished CTE instructors know that students provided with this level of attention are more likely to become involved and engaged with their educations. Students are inclined to value their schooling and believe in their ability to realize personal and professional aspirations when teachers care for them this way. Accomplished educators thus reinforce attention, affirmation, and affection throughout all learning activities to help students acquire the self-motivation and develop the self-efficacy they need to achieve their career goals. CTE instructors convey this respect for students in all facets of their education and ensure that students respect each other as well. Importantly, teachers understand that this process must take place every time they interact with students, at the start of a school year, a new course—on a daily basis as students change and grow.

Accomplished CTE teachers develop rapport with their students and gain information about them in many ways. First and foremost, educators foster positive relationships with their students so they can learn about them as individuals. Teachers supplement this kind of meaningful interaction with other strategies, such as having students submit interest inventories in class, asking about students' extracurricular activities, or giving assignments that invite students to share information about themselves. For example, a culinary arts teacher may have students plan a menu for a family celebration so she can learn about her students' cultures while developing their menu planning skills. CTE instructors have informative exchanges with their students during learning activities and use every resource they can within the school environment to find out more about them. Teachers study assessment data, read through academic records, and speak with other members of the learning community

¹ The terms “family” and “parent” are used throughout this document to refer to people who are the primary caregivers, guardians, or significant adults in the lives of children.

acquainted with their students. To supplement their knowledge of students and gain a fuller understanding of students' lives, teachers solicit information from family members as well. These discussions may occur during open house activities or home visits or through personal communication, electronic or otherwise. (See [Standard VIII—Partnerships and Collaborations](#).)

Meeting Students' Academic Needs

Relying on their knowledge of students, accomplished CTE teachers advance learning by tailoring instruction. For example, a health instructor might optimize student success by matching her students to clinical sites based on their skill sets and personalities; while evaluating their progress, the teacher may then raise individual problems regarding the maintenance of professional attitude or demeanor so students can reflect on and improve their performance. Educators place students in carefully sequenced programs and differentiate instruction to complement their students' various learning styles and stages of development. For instance, prior to a unit on cakes, a family and consumer science teacher may ask students to write about their most recent baking experience; the teacher may then use these descriptions to assess his students' familiarity with cake baking and ensure that lessons are structured to build on their interests while strengthening their weaknesses. Alternatively, an accounting teacher who wants to motivate her students and learns they are avid soccer fans during class discussion may have them analyze statistics about their favorite teams as they apply different formulas to a spreadsheet. The observations that teachers make and the information they gain along the way help them clarify the status of student learning and move it forward. Based on a clear understanding of their students as learners and individuals, instructors can make informed decisions about pace, scaffolding, or differentiation. To achieve success, CTE teachers introduce students to specific skills, processes, or techniques based on their individual status, continually evaluating student achievement and readiness for next steps.

Accomplished CTE teachers have a rich repertoire of teaching methods they use to reach every student, employing visual, auditory, and kinesthetic approaches to establish the meaning and purpose of course content. Instructors address tasks, lessons, and projects from different vantage points so students can access concepts in ways that make the most sense to them and can appreciate the relevance of the material from their unique perspectives. For example, to assess student understanding of how a bill becomes a law, a government services teacher might allow students to choose how they will demonstrate mastery—perhaps by performing a monologue, writing an essay, or creating a flowchart. Educators inspire their students' curiosity and imagination by tapping into their individual interests. They provide students with opportunities to explore connections between the content covered in class or lab and the questions forming in their minds, helping students build their capacity and invest in their learning by strengthening weaknesses and filling gaps. For instance, if a teacher has a student who lacks effective study skills, the teacher may connect the student with a tutoring resource and guide her through a series of mini-lessons aimed at fostering and demonstrating her improvement; when the student witnesses her growing ability, she may gain greater confidence and interest in seeing further

progress. A clear understanding of what students know and can do, coupled with a thorough knowledge of students' values, beliefs, and attitudes, allows CTE instructors to design exciting and powerful educational opportunities for all their students.

Within the learning environment, accomplished CTE teachers keep the progress of the whole group in sight even as they focus on individuals. They differentiate instruction to meet unique needs while addressing the learning styles and abilities of all their students. For example, a teacher leading a cooperative learning activity in a cosmetology class may assign students to teams based on their strengths in hair cutting or coloring. By grouping students purposefully in this way, the teacher may allow students with technical weaknesses and other learning issues, such as limited English language proficiency, to receive support from their peers. Similarly, in a collision repair course, an instructor may intentionally group students so that those with physical limitations work with more athletic peers when tasks become physically demanding. Accomplished teachers build support networks for their students while setting high expectations and challenging everyone to venture beyond their comfort zones. They encourage students to develop self-efficacy and master competencies across skill and ability levels. For example, a fire management teacher with an academically gifted student who tends to work at a faster pace may enrich her educational experience and deepen her understanding of course objectives by assigning the student an independent project to design an authentic crisis management plan for the school. CTE instructors are proactive in the engagement and advancement of all students, providing them with extra time and assistance as needed, designing multiple opportunities for students to demonstrate their knowledge, and offering advanced students chances to explore course content in greater depth. (See [Standard IV—Learning Environments and Instructional Practices.](#))

Meeting Students' Professional Needs

Accomplished CTE teachers not only know their students, they help their students know themselves better as well. Instructors help students recognize their specific strengths so they can establish worthwhile personal and professional goals. CTE teachers work with students to build their skill sets, exposing them to a range of career possibilities and encouraging them to consider which options best match their talents. Based on students' skills, interests, and inclinations, teachers advance students' work in their chosen career fields, assessing their ability to meet learning objectives and guiding students through capstone experiences. For instance, a teacher may encourage students who have completed foundational courses in wildlife management to participate in an environmental and natural resources competition. Accomplished teachers align curricula with students' needs and modify them consistently to meet the changing demands of the labor market. This type of ongoing evaluation and revision allows teachers to connect the emerging talents and abilities of their students with clearly articulated requirements of business and industry. The CTE learning environment is centered on student needs and academic preparation, all pointing toward the goal of acquiring workplace values, developing life skills, and realizing professional aspirations. The intentional focus on career preparation motivates students to create professional growth plans and monitor their progress as they build positive self-images. (See [Standard VI—Postsecondary Readiness.](#))

Accomplished CTE instructors use project-based learning activities, real world simulations, and other work-based opportunities, such as job shadowing and internships, to develop their students' employability skills and help them gain practical and theoretical knowledge of their career fields. Teachers guide students carefully through activities and simulations; they promote their students' professional development by providing students with instruction in critical concepts and principles and fostering their students' sense of individuality as adolescents, young adults, and nascent professionals. Having students select projects based on their interests and aspirations, or pursue an approach to a task or problem based on their experience and knowledge, encourages independent thinking, builds confidence, and inspires students to take pride in their work. Many times, the students of accomplished teachers take on projects they believe will have a direct impact on their communities, such as creating a web-based marketplace to sell jewelry or opening a restaurant to serve teenagers healthy yet appealing foods. Throughout learning activities, CTE teachers communicate high expectations and motivate their students to strive continuously for excellence in themselves and their teams while maintaining a healthy work and life balance. Instructors understand that work-based opportunities create a strong sense of ownership in their students and inspire meaningful engagement with their learning objectives and professional growth plans.

As students experience self-discovery and build self-confidence, accomplished CTE teachers continue to learn more about them and support their students even more closely. Instructors work through goals with their students based on a sense of mutual respect. Using the holistic knowledge they gain, teachers provide students with learning experiences that encourage them to develop their academic knowledge and technical skill base as they explore personal and professional issues likely to reappear in college or the workplace and throughout their lives. Accomplished educators support their students throughout this process of development, acting as teachers, mentors, role models, and work supervisors. CTE instructors form trusting, nurturing teacher-learner relationships with their students and establish a challenging, rigorous manager-employee dynamic as well. Accomplished teachers balance these demands to meet the primary goals of career and technical education: the transformation of adolescents into adults and students into professionals.

Standard II

Responding to Diversity

Accomplished teachers create learning environments characterized by fairness, equity, and a respect for diversity. They use inclusive teaching practices and advocate to ensure that all students receive a quality career and technical education.

Like workplaces in the world at large, career and technical education (CTE) classrooms and labs are diverse. Accomplished CTE teachers embrace the diversity of their learning environments and educational communities, recognizing the ways in which we are the same and different based on factors such as learning styles, gender, sexual orientation, race, ethnicity, age, national origin, socioeconomic status, culture, and religion. Teachers acknowledge that individuals come to their programs with a wide range of political, philosophical, and ideological beliefs and affiliations. They recognize the broad array of ability levels and background knowledge that students bring to their courses, and they engage groups of students to work together and achieve common goals in this context. Accomplished teachers not only accept and support the diversity in their classrooms—they capitalize on it to enrich and extend their students' learning opportunities.

The advantages of working successfully with people who have different perspectives and talents are immense. Accomplished CTE teachers understand the importance of this view and communicate it to students through their words, actions, and attitudes. Instructors strive to ensure that everyone is treated fairly and respectfully in their classrooms and labs, regardless of individual qualities, characteristics, or distinctions. They support the expression of different ideas and incorporate contributions from all students during the planning, management, and completion of work-based projects. Accomplished teachers are deliberate about instructional inclusivity, meeting each student where she or he stands, developing their practices to help each student move forward, and consistently setting high expectations for everyone to share. Instructors continually monitor their learning environments to make sure all students have access to a quality career and technical education and work with students so that they leave CTE programs with a thorough grasp of the behaviors and beliefs likely to bring them satisfaction and success in the world of work. CTE teachers are proactive, dedicated to advancing awareness of and engagement with diversity to create quality educational experiences in programs that welcome and include all students.

Accomplished CTE teachers understand that creating open and inviting learning environments free from harassment or bullying is essential to promoting full access

to, and retention in, career and technical education. To make sure all students feel valued, respected, and supported in their classrooms and labs, educators create emotionally safe environments in which students are comfortable interacting in every context, whether with their peers or teachers. Instructors achieve this goal by modeling respectful communication, establishing clear expectations and ground rules, and educating students about what does and does not constitute appropriate or acceptable behavior in the learning environment. During course orientations, CTE teachers clearly outline expectations for successful communication while actively engaging students in formulating classroom guidelines linked to workplace practices.

By showing respect for all individuals, valuing their input, and insisting that students treat each other with fairness and dignity, accomplished CTE teachers model and promote the behaviors necessary for citizenship in a multicultural society and success in a globally competitive and increasingly transnational workplace. Teachers know that the attitudes they manifest as they work with students, families, colleagues, community members, and all other stakeholders provide powerful exemplars for their students; therefore, accomplished teachers conscientiously demonstrate the kind of behavior they expect to see in their students. Instructors engage students in conversations about their attitudes and demeanor as well to reinforce the importance of demonstrating consideration for others and to show students the benefits of considering various viewpoints and insights. Accomplished teachers know that for some of their students, being aware of and responding appropriately to diverse people and points of view may be a new experience. CTE instructors are careful to help these students understand the rationale for professional and ethical behavior. Teachers understand that some students may harbor beliefs and biases that are at odds with the attitudes that they, as role models and mentors, are working to develop. Accomplished teachers respond directly to such challenges, emphasizing the value and significance of fairness, equality, and respect in learning environments, communities, and the workplace. Strategies may include one-on-one conversations with students, facilitated class discussions, or learning activities designed to enhance student awareness and understanding. For instance, a business law teacher with students who continually disagree as they prepare for a mock trial might have the students exchange roles as attorneys, judges, and witnesses so they can appreciate the challenges and biases their peers face and use this understanding to modify their behavior and resolve their conflicts going forward. Accomplished teachers draw on a range of possible intervention strategies to address student bias.

Accomplished CTE teachers know that, on occasion, they also come to the learning environment with opinions and unintentional biases based on their experiences. These views can relate to any aspect of diversity, from sexual orientation to personal appearance. For teachers, as for anyone, their perspectives are evident through actions or conveyed implicitly through attitude or demeanor. Accomplished educators come to realize and understand their viewpoints during reflection, when they consider the significance and impact of their interactions with students and other people. As a result of careful rumination, CTE instructors acknowledge their values and beliefs, develop a deeper sense of self-awareness, and strive to ensure that their personal views do not affect student learning adversely. For example, an agriculture teacher presenting a unit on livestock management will set aside his negative view of

vegetarian lifestyles so he can create a safe learning environment where differences of opinion may be discussed respectfully. Instances of bias are not always so explicit and can be more covert. So, for instance, a female interior design teacher who spends more time evaluating the plans submitted by female students because she unconsciously assumes they are more creative than their male counterparts may be surprised when she sees promise in the work of a male student; after discovering her gender bias and analyzing it further, the instructor could then alter her approach to ensure she reviews her students more fairly in the future. While uncomfortable at times, accomplished teachers accept and confront their own biases, making appropriate changes in their practice to support student success.

To support the implementation of equitable and inclusive teaching practices, accomplished CTE teachers regularly review their instructional materials for bias as well. They work to ensure that teaching materials do not perpetuate racial, ethnic, cultural, socioeconomic, or gender stereotypes and confirm that the materials are accessible to, and inclusive of, all their students. For example, a natural resources teacher who recognizes that a textbook does not present enough examples of women working in the field may supplement the curriculum with lessons targeting women's significant professional contributions. Similarly, a family and consumer science instructor who teaches culinary arts may encourage student input while planning labs so students can learn about the cultural and ethnic backgrounds of their classmates through their native cuisine. When developing lesson plans, accomplished CTE teachers consider how they can make instruction as responsive to the needs and interests of their students as possible. They take into account the composition of students within their learning environments so they can design lessons that address diversity in strong and meaningful ways. For instance, a public administration instructor who teaches in a classroom with a large number of Hispanic students might supplement a text by U.S. Supreme Court justice Thurgood Marshall with a speech by César Chavez to begin adding more voices to a discussion of civil rights. Techniques like this one help accomplished educators increase the positive impact of their teaching on students.

Accomplished CTE teachers regularly expose their students to people, cultures, and situations that might be new to them and help students develop comfort and ease interacting with individuals in these settings. Teachers utilize a number of strategies to meet this objective, such as including role models from diverse groups when inviting guest speakers and instructors to their classrooms. So, for example, an automotive technology teacher might intentionally bring in a female auto technician to lead a unit on the maintenance of hybrid cars. CTE instructors provide their students with the opportunities they require as individuals to strengthen their interpersonal skills, develop communication techniques, and build confidence collaborating with various people in the workplace. Teachers deliberately change student groupings as well so students experience the full diversity of skills, beliefs, aptitudes, and attitudes inherent within classrooms and labs. Instructors pay close attention to how interactions change when students work with each other and may have groups confront workplace problems during role-playing exercises, or in the midst of project work, so students can learn conflict resolution skills. Accomplished teachers know that students who work collaboratively stand a far greater chance of

succeeding in the global marketplace, and they have students practice the skills they need to work on diverse teams. In all these ways, CTE teachers help their students distinguish between attitudes and behaviors likely to engender disruption or dissent in the workplace and those likely to bring success and satisfaction.

Accomplished CTE teachers not only show their students the professional benefits of working on teams with different groups of people, but also instruct their students in the social imperative of respecting workplace diversity. Teachers help students understand the laws and policies that protect individuals from discrimination, harassment, and bullying. CTE instructors are aware that some students may misunderstand or have strong feelings about such regulations and that others may already have direct experience in these areas. In these instances, teachers help students expand their knowledge base and make informed decisions by sharing additional information as appropriate. For example, a CTE teacher may highlight issues related to harassment and bullying covered in the media and explain school and classroom policies in light of these realities. Accomplished CTE instructors provide their students with opportunities to discuss the ways that laws, policies, and societal expectations related to diversity may affect their lives.

The use of equitable and inclusive teaching practices allows accomplished CTE instructors to address diversity in a straightforward and constructive manner that benefits everyone in the learning environment. When students understand the challenges and rewards that diversity brings, they are more likely to feel comfortable and confident contributing to the educational experience they share with others. Building an awareness of diversity issues allows students to function better in the workplace and helps them develop emotional intelligence that will enrich their professional and personal lives.

Standard III

Knowledge of Content

Accomplished teachers utilize their technical and professional knowledge as well as their interdisciplinary and pedagogical skills to develop curricular objectives, design instruction, promote student learning, and facilitate student success within industry.

Accomplished career and technical education (CTE) teachers are experts in their professional fields and proficient within their career pathways, or specialty areas. They continually refine their technical knowledge and skills, ensuring that their practice is aligned with current industry standards, trends, and technologies. They stay abreast of the latest findings and comply with work policies and regulations by maintaining professional ties within their industry. CTE teachers also develop and extend their expertise beyond technical content to include relevant subject matter knowledge and transferable skills like problem solving and teamwork. Accomplished CTE instructors draw on a wide range of subject areas and skill sets. As career professionals, CTE educators utilize transferable skills to function in the workplace while relying on cross-disciplinary and industry-specific knowledge to complete project tasks. As academic teachers, they understand which subject areas and skills to target during instruction and how combined content should be imparted so students can gain the practical knowledge they need to succeed in higher education and the world of work. In this sense, pedagogical awareness constitutes an interrelated body of knowledge in itself, the byword of the accomplished CTE teacher being “integration,” at all times, in all guises.

Accomplished CTE instructors are reflective educators and lifelong learners who continually improve their practice. They create dynamic learning environments that help students gain a comprehensive view of their professional fields and career pathways. To foster student learning, CTE teachers design engaging performance-based activities that utilize a variety of strategies, methods, and resources to promote students’ conceptual and experiential understanding of content knowledge. Teachers encourage students to assess situations holistically instead of focusing on tasks in isolation. They show students the value of timely reflection to evaluate pros and cons and determine task feasibility before investing energy and effort in a specific approach. For example, an information technology teacher may group students so that some begin developing a web page using web authoring programs, while others work with scripting language; by comparing the groups’ progress on the assignment, students could assess which web design platforms provide the best capabilities to create effective websites within a specific context. CTE instructors teach their students to think critically and analytically while using relevant technology, so students can tackle

problems and persevere when solutions do not come quickly or easily. Accomplished teachers challenge their students to use facts wisely, reevaluate their situations constantly, and think creatively to design innovative strategies for completing their work.

Whenever possible, accomplished CTE teachers emphasize the importance of developing employability, or transferable, skills to achieve performance-based results that align with industry needs. Teachers engage students at their current level of development and help students grow further as individuals. They encourage students to take risks and reflect on success as well as failure, so students can adjust their approach based on experience. CTE instructors show their students how to communicate with other people—to interact with them ethically and professionally, knowing how and when to lead and follow—so students can be productive whether they work alone or collaborate in teams. Teachers stress the importance of foundational skills, such as how to budget and manage money or how to plan and schedule time. For example, a sewing instructor may have students create marketing, production, and sales plans before using digitizing software to design and embroider sports towels with team logos for fans and supporters. Aware that the world today is much more interconnected than ever before, CTE instructors show their students they are global citizens, living, studying, and working in diverse communities, subject to the demands of a transnational economy. In various manners and contexts, CTE teachers provide the students in their courses with tools and strategies as well as facts and figures, with workplace readiness in addition to technical knowledge.

To design authentic challenges that enhance student learning, accomplished CTE teachers simulate real-world experience. Teachers integrate multidisciplinary demands into job tasks; within assignments, they incorporate appropriate workplace scenarios, such as tight deadlines, customer feedback, and emerging project requirements. For example, an engineering teacher preparing a team for a robotics competition may require students to manage the logistical details leading up to the event, such as budget and project planning, purchasing, communication protocols, implementation strategies, and transportation. Similarly, a family and consumer science instructor who teaches culinary arts may have his students design a banquet for the school board and organize the event by planning the menu based on a budget, purchasing supplies and setting up the facility, preparing and serving food, and cleaning the facility at the end of the night. CTE teachers ask students to coordinate the demands of invention and production so they can understand all aspects of professional activity. Instructors encourage their students to practice their employability, cross-disciplinary, and industry-specific skills in a “hands on” manner by participating in business opportunities organized within classrooms and labs and undertaken through internships and externships.

Cross-Disciplinary Knowledge

Within their professional fields, accomplished CTE teachers utilize bodies of knowledge from English language arts, history and social studies, mathematics, and science. Skilled at the application of these disciplines, they are capable of reading

theoretical documents related to their fields as well as technical manuals based on these documents. CTE instructors draw on this cross-disciplinary knowledge when teaching subject matter central to their career fields and areas of expertise. For example, an automotive technology teacher may review the mathematics and physics concepts underlying the successful completion of a brake repair job, a carpentry teacher may analyze the geometric principles guiding the design and construction of roofing systems, and a performing arts teacher may discuss the subtle appreciation of language and literature needed to deliver dramatic monologues. CTE teachers instill the importance of learning by showing students the relationship between the general academic content presented in core classes and the applied technical knowledge taught in CTE courses.

Accomplished CTE instructors integrate academic subjects meaningfully into their CTE content to support the broader learning needs of their students. They provide students with opportunities to build skills in different disciplines through applied instruction, helping them appreciate the relevance of middle and high school curricula and the significance of mastering key concepts. CTE teachers nurture their students' skills by building on prior learning and working with instructors in other departments to develop interdisciplinary projects.

English Language Arts

Accomplished CTE teachers understand that mastery of English language arts is critical to success in postsecondary education and employment. They know the influence and impact that this subject area has across curricula, and they incorporate reading, writing, speaking, and listening tasks meaningfully into CTE learning environments to demonstrate their significance in higher education and the world of work. While reviewing industry-based documents, CTE teachers cultivate their students' reading skills, fostering their ability to interpret texts carefully and critically. As students produce their own documents during project-based activities, teachers develop their writing skills as well, strengthening their students' ability to communicate clearly and persuasively. For example, a multimedia instructor may have students compare and contrast the information in technical manuals while troubleshooting compatibility issues and drawing conclusions about system requirements; a health services teacher may ask students to write succinct descriptions of patient symptoms and vital signs for medical records that physicians will review; and a horticulture instructor may have students create plant descriptions that cite botanical classifications while providing care instructions easily understood by the average consumer. Accomplished CTE teachers reinforce their students' reading and writing ability throughout learning activities related to their fields of expertise.

To advance their students' speaking and listening proficiency in the workplace, accomplished CTE instructors develop their oral and auditory skills in one-on-one conversations, group discussions, and formal presentations. For instance, a business, marketing, and financial services teacher may ask students to converse with professionals while preparing for job interviews so students can practice exchanging ideas through questions and answers, gain experience articulating current issues in their field, and work on expressing themselves concisely in a career setting. Similarly,

in preparation for a stage performance, a theatre teacher may have students analyze a recorded monologue so they can critique the performer's enunciation and vocal characterization. CTE instructors demonstrate the important role that interpretive techniques, rhetorical strategies, grammatical conventions, and professional etiquette play in a range of situations. They show students how to utilize inferential reasoning, evaluate purpose and audience, and modulate voice and tone to construct meaning and communicate ideas effectively and appropriately in the workplace. CTE teachers address these issues in a variety of professional contexts, helping students consider how and when their approaches might change to satisfy the shifting cultural customs and expectations of an increasingly transnational business world.

Accomplished CTE teachers incorporate every communication skill in project tasks that require students to construct sound arguments using persuasive, industry-appropriate evidence. For example, a construction technology teacher may have students research sustainable design materials so they can prepare written reports about building processes, gather helpful visual aids, and deliver oral presentations pitching their projects to a prospective client. Likewise, a theatre instructor may have students study past productions of William Shakespeare's *Romeo and Juliet* as they adapt the literary work and stage a modern interpretation of the play; or a biotechnology teacher may have students organize a professional conference, prepare position papers, and participate in a series of debates focusing on ethical issues in industrial settings. In work-based activities like these, CTE instructors emphasize the importance of conducting thorough research, citing sources accurately, and utilizing critical thinking to demonstrate professional competence while achieving project goals. They teach students the difference between well-supported views and unsubstantiated assertions and show them the professional implications of advancing one versus the other. In their classrooms and labs, CTE teachers focus on the practical application of English language arts to advance professional goals and business initiatives.

History and Social Studies

In their classrooms and labs, accomplished CTE teachers engage concepts related to history and social studies within the context of career and technical knowledge. Teachers address ideas and movements related to their field of expertise through a number of lenses, examining cultural relevance, historical impact, social implications, economic repercussions, and civic ramifications. They ground their discussion of these topics by considering the perspectives of professionals working within industry and citizens contributing to local, national, and international communities within a global marketplace. For example, a computer science teacher may discuss how market demands and labor costs within the software industry have evolved and follow up by having students investigate the economic outlook for different sectors so they can develop a deeper understanding of the trends within this career area. Likewise, an engineering teacher may discuss the rise of factories and the related shift from agrarian to industrial economies while teaching students about the impact that their innovations and inventions can have on society. Finally, a marketing instructor may discuss the political climate and cultural mores of developing countries with her students while they run a cost benefit analysis to ascertain the risks and advantages

of adopting various workforce strategies to maximize the economic performance of an entrepreneurial venture. CTE instructors show students how they can use an appreciation of history and social studies to inform their professional practice, build cultural competence, and make sense of a changing world.

Accomplished CTE teachers discuss themes and issues related to political science, sociology, and psychology as well to provide their students with a framework for understanding the interactions of individuals within communities, whether formed within a work organization or a geographical region. Informed by an understanding of civic process and public discourse, teachers establish learning environments that model democratic rights, responsibilities, and values; contribute to students' appreciation of, and respect for, diverse viewpoints; and encourage the growth of leadership skills and abilities. For instance, a CTE teacher may take his students to the state capitol to meet with legislators and advocate for their program so students can learn more about democratic participation and purposeful debate. CTE classrooms encourage active social involvement and fair play, as well as justice and due process. Teachers furthermore show their students that people in a democratic society have the right to disagree, that multiple perspectives should be taken into account when reaching group decisions, and that judgment should be based on evidence rather than bias or emotion. Accomplished CTE teachers help their students become productive members of society, making sure they understand how professionals in their fields can and should interact effectively with government agencies so they can meet local, state, and federal laws and requirements.

Mathematics

The signs and symbols of mathematical disciplines constitute a universal language allowing people from diverse lands and regions to communicate ideas, advance industries, and build economies together. Accomplished CTE teachers understand various aspects of mathematics as they relate to their professional fields. These areas may include number systems, algebra, geometry, statistics, probability, discrete mathematics, calculus, or other fields. Applied mathematics represents a major component of most specialty areas, from using statistical analyses to predict the success of a small business to calculating the current in microcircuits in the latest communication device or interpreting graphical analyses of rainfall patterns in pristine natural forests. CTE teachers show their students how mathematics can help them reason analytically and think strategically while solving problems in workplaces around the globe.

Accomplished CTE teachers help students develop their mathematical skills in context. For instance, culinary arts students might divide fractions and multiply decimals to convert measurements and alter the portion yield of a recipe. Or business students might rely on accounting principles while creating budgets and logging expenditures. CTE instructors review essential mathematical operations with students as they analyze technical questions and communicate outcomes to constituents. Teachers help their students think mathematically when they approach situations, study and explore patterns, formulate problems, and develop reasoning that is logical and systematic. Educators show their students how to use mathematical knowledge

to solve a wide range of practical problems—to move beyond simple calculations and develop critical thinking strategies based on concepts such as algebraic logic or decision matrices. For example, a culinary arts teacher might create a formula with students to determine how many cookies will fit into a gift box based on the volume of the rectangular box and the cylindrical shape of the cookie. Similarly, a health science instructor might work with students to ensure they understand the significance of, and relationship between, variables used in formulas to calculate medication dosages. Finally, an agribusiness teacher may have students use decision matrices to weigh criteria and make objective choices about resource priorities for a farm management project. Accomplished CTE teachers have students explain their mathematical reasoning in oral and written forms as well as graphical representation so students gain a better understanding of their thought processes and strengthen their critical thinking. By learning how to explain and communicate their conclusions, the students of accomplished teachers acquire the ability to extend their reasoning and relate their conclusions to the understanding and solution of other problems. CTE instructors provide their students with the experience they need to use mathematics comprehensively, as a tool within industry and a means of managing simple and complex economic situations.

Science

Like mathematics, science is a subject area that connects people developing ideas and designing products in different countries and cultures. Accomplished CTE teachers understand scientific principles and methods that are directly related to their areas of expertise and appreciate the way these concepts unite them with professionals working within a transnational economy. As applicable, CTE instructors integrate core concepts from the life and physical sciences into their fields of study, making science meaningful to their students by showing them its significance in real-world situations. When working with the life sciences, teachers know about and address topics such as the structure and function of cells, the diversity and unity that define life, the physical constitution of living organisms and the function of their parts, the genetic basis for the transfer of biological characteristics, the life cycle, the dependence of organisms on one another and their environment, the flow of matter and energy through the environment, and the evolution of species. Importantly, instructors explore these topics within their professional contexts. For instance, a dance teacher might discuss human anatomy while explaining the techniques his students should employ to reduce the risk of physical injury. A family and consumer science instructor who teaches child development may describe cognitive brain development to illustrate the rationale for adopting an instructional strategy. Or a health services teacher working with students to assess a patient experiencing an allergic reaction to medication might use the scientific method while analyzing the medication's effect on various body systems. In this final example, as in many other instances in the CTE learning environment, the teacher combines knowledge of a scientific practice with understanding of scientific content to answer questions typically encountered in the workplace. When working with the physical sciences, accomplished CTE teachers know about and address topics such as the properties of matter and the forces governing its interactions; the forms of energy, its transformations, and its relationship to matter; and the principles of kinetics and

motion. They also discuss relevant concepts from the earth and space sciences, which include the origin, composition, and structure of the universe; the uniformity of all materials and forces; the motions of the Earth and the systems that compose it; the processes that shape the Earth's surfaces; and the relation of these cycling processes to the environment. Here, for instance, an automotive teacher speaking with students about patterns of wear and tear on brakes might discuss how road factors and driving characteristics exert force on the pads over time. In all these examples, CTE teachers use scientific principles as tools for analyzing technical issues and problems.

Based on their knowledge of scientific methodology and inquiry-based instruction, accomplished CTE teachers create opportunities for students to develop problem-solving strategies while thinking, acting, and communicating their findings as scientists. Teachers have their students research, organize, and evaluate information in projects that contextualize this process within the world of work. For example, a criminal justice instructor may have students research the chemical reactions that take place when luminol interacts with proteins in order to determine why these proteins are visible when viewed under an ultraviolet light, why this interaction would be relevant within an investigatory context, and how it should influence the techniques they use to gather and interpret evidence. Accomplished CTE teachers make connections between science and their technical fields exciting for students, encouraging them to develop an appreciation for scientific disciplines and a respect for empirical evidence while working through problems that challenge their creativity and imagination and invite them to compare their hypotheses with those of others. For instance, a civil engineering teacher may help students answer their own questions about bridge design by having the class test the weight capacity of trusses selected by different project teams using real-time stress point data from a computer simulation. To help students explore the relationships between science, technology, engineering, and mathematics—and the ways they shape the world we live in—CTE teachers adopt multidisciplinary approaches in projects driven by inquiry-based learning, hypothesizing, experimentation, and data analysis. The students of accomplished CTE teachers plan projects, ask questions, make observations, interpret data, draw conclusions, and develop solutions. Throughout these activities, they feed their curiosity about the world and apply their knowledge of scientific methods and concepts within their professional fields of interest.

Industry-Specific Knowledge

The knowledge base and the teaching practice of accomplished CTE teachers share a number of similarities across career pathways, or specialty areas. Teachers take an interdisciplinary approach to career and technical instruction, introducing students to techniques and methodologies informed by an appreciation of different disciplines and grounded within a current understanding of industry-based skills, trends, and performance standards. CTE instructors develop challenging projects that emphasize the importance of problem-solving and help students acquire transferable skills to increase their employability. Importantly, educators encourage students to extend the experience they gain through applied learning by pursuing internships and other work-based positions and by earning industry certifications.

Helping students achieve success in a rapidly changing job market is the goal shared by all accomplished CTE teachers.

While the technical knowledge that accomplished CTE teachers have varies widely according to their specialty area and field of expertise, there are common themes cutting across career pathways. Topics like marketing and entrepreneurship may be based primarily in Business, Marketing, and Financial Services, but they are relevant to other specialty areas as well, such as Leisure and Recreation Services or Transportation Systems and Services. Similarly, tools like computer-aided design (CAD) software and other forms of technology initially developed for career fields in Engineering, Design, and Fabrication are also used by professionals working within Community Services; Decorative Arts and Design; Information Systems and Technology, Communications, and the Arts; and Natural Resources. Accomplished teachers understand the connections that exist between their knowledge and skill sets as well as the ways their specialty areas relate to other areas within career and technical education. The industry-specific descriptions that follow thus outline distinct bodies of knowledge related by similar professional contexts.

Business, Marketing, and Financial Services

Accomplished CTE teachers in this broad specialty area focus on education for, and about, business. The academic and occupational content of this career cluster addresses **business, management, and administration; finance; and marketing, sales, and services**, which are further divided into a number of professional fields. These are accounting, banking, business information management, business law, business technology, communications, economics, e-commerce, entrepreneurship, human resource management, international business, merchandising, personal finance, project management, and sports marketing. The subject matter knowledge of CTE teachers can therefore vary widely within this pathway. It may relate to one or more fields in one or more different industries and may be further specialized according to factors such as business type (sole proprietorship, partnership, or corporation), setting (brick and mortar, online, or hybrid), or sector (private or public).

Today's rapidly changing marketplace requires professionals in all fields to understand the latest tools and methods for handling business functions, such as current management models and modes of virtual communication. Accomplished CTE teachers working within the domain of **business, management, and administration** appreciate the vital importance of selecting the best solutions for a specific situation and implementing them with skill and insight. Teachers introduce their students to the qualities and characteristics of business systems and methodologies that will help students achieve success in high performing workplaces. At the management level, instructors have a thorough understanding of supervisory functions, project management, strategic planning, and employee training and development. They also have detailed knowledge about processes related to office management, such as the coordination of meetings, travel, and mailings. In terms of business technology, accomplished CTE teachers are adept in a range of business communication and computer applications used for word processing, data management, virtual communication, and oral presentations. Some teachers in this career cluster may

also specialize in website development, multimedia design and publishing, gaming, animation, and programming. All instructors in this domain are acquainted with business law as it affects their field of expertise and understand current guidelines governing the operation, ethical practices, and regulatory agencies involved in small business management.

In the realm of **finance**, accomplished CTE teachers instruct students in general accounting functions, payroll and personnel records, and inventory systems. Teachers also have a broad understanding of concepts related to personal finance, including taxation, budgeting, banking services, and financial planning. Accomplished CTE teachers use their knowledge to foster the financial literacy of their students and guide them toward careers in this domain. Work within the field frequently relates to work performed in other specialty areas due to its broad relevance.

Accomplished CTE instructors specializing in **marketing, sales, and services** teach principles and methods applicable to a variety of professional fields, including those outside the area of Business, Marketing, and Financial Services. Knowledge within this domain relates to the sale of goods and services based on product value and customer need, which entails identifying and developing products, establishing their price, determining suitable distribution channels, and implementing promotional strategies. Topics of interest thus include purchasing, pricing, promotion, marketing information management and research, product and service planning, distribution, financing, e-commerce, entrepreneurship, warehousing, distribution, and risk management. These concepts are pertinent in career fields as diverse as advertising, merchandising, financial services, travel and tourism, food marketing, hospitality services, and sports marketing. Small business owners in all sectors of the marketplace benefit from strong entrepreneurial skills, which include an understanding and appreciation of risk, profit, independence, sacrifice, and leadership, as well as technical knowledge and ability in marketing research and feasibility studies, business plan development, financial securement, and small business operations. Accomplished instructors teach these concepts through scenarios that require students to integrate them in practice. For example, a marketing teacher might work with students to conduct a needs analysis for consigning pre-owned prom dresses and then develop a marketing campaign to advertise and sell the service. CTE teachers in the specialty area of Business, Marketing, and Financial Services instruct their students in all aspects of starting, owning, and managing a business.

Community Services

Accomplished CTE teachers in Community Services instruct students in **government services, health services, human services, and law and public safety**. Educators working with young adolescents educate them in the use of public resources and the development of social processes to promote the safety and well-being of individuals and families across all communities. Teachers working with older adolescents extend these lessons, preparing students for the challenge of managing work and family roles as they meet social responsibilities. Teachers also train students to attain professional positions in agencies and organizations that sustain communities.

Government services comprise the planning and implementation of public administration activities on a local, state and national level, while **law and public safety** addresses law enforcement, correctional services, and fire science. Education in these domains positions students for careers in governance, national security, and military science, as well as homeland security, criminal justice, legal services, and fire management, among others. Like their colleagues employed in these areas, accomplished teachers are motivated to perform public service work based on their desire to serve. The altruistic nature of **government services** and **law and public safety** is embedded within the instruction of CTE teachers, who always connect their instructional content to the well-being of others. For example, a public safety instructor may begin a unit on crisis management by having students research current theories, explore planning resources, and meet with local fire and law enforcement officers; students working in teams might then develop a crisis response plan for a local shopping mall and deliver presentations explaining how their plans would protect the public. Knowledge and skills essential to these areas relate to legal structures and processes, organizational management, and communication with the public. Accomplished CTE teachers working in these domains possess a basic understanding of local, state, and national laws, in addition to public administration policies and regulations, human psychology, and crisis management, based on their specialization.

Health services encompasses diagnostic, therapeutic, and medical laboratory services, as well as nursing, health informatics, and health care administration and management. Accomplished CTE instructors working in this domain possess general medical knowledge related to such topics as anatomy and physiology, laboratory procedures, biohazardous waste disposal, and medical documentation. Teachers convey technical understanding of bodily structures and functions, diagnostic methods and procedures, and proper patient care. Possessing specialized knowledge based on their field of expertise, they introduce, model, and provide their students with opportunities to practice techniques in cardiopulmonary resuscitation, first aid, vital sign monitoring, phlebotomy, radiology, electrocardiography, and other areas. Instructors also help students develop skills in the management of health care systems, such as medical transcription and coding. CTE teachers have a strong understanding of the legal, ethical, and safety guidelines governing their professional practice. Well versed in risk management, they avoid medical mishaps while dealing efficiently with accidents that may occur, like radiation exposure or needle sticks. Educators typically have substantial experience in hospitals, clinics, or urgent care facilities and retain state credentials in their fields. When sharing their knowledge with students, teachers make sure their students gain professional insight on the history of health care, emerging trends, and new career avenues. The experience that students gain in this domain assists them in the pursuit of careers as medical assistants and technicians, nurses, physical therapists, and athletic trainers, among others.

The domain of **human services** includes a wide range of career fields: child and family services, counseling and mental health, consumer services, food and nutrition, cosmetology, interpretation, and teacher training. Accomplished CTE instructors working in child and family services and in counseling and mental health have a strong background in psychology. They educate students about the physical, social,

intellectual, and emotional characteristics of human development and the ways these traits inform the personal needs and priorities of individuals at various stages of their lives. Teachers also address the effect that cultural values and beliefs have on personal and social interactions. They show students how to relate to, and learn from, people of differing ages so students can develop the skills and tools they need to support individuals experiencing difficulty and help them and their families work through challenges and crises. Educators explain the use of stress management and coping skills as well as other solutions to resolve interpersonal conflict. They help students develop problem-solving and decision-making skills to improve the quality of individual and family life and teach students assessment and intervention strategies to assist children and families at risk. CTE teachers introduce their students to the complex network of services available from evaluation to implementation and show students how to coordinate their services with those of therapists, psychiatrists, guidance counselors, and other professionals throughout the community.

The knowledge of accomplished CTE teachers working in consumer services, food and nutrition, and cosmetology is based in health and economics but varies in relation to their field of expertise. In consumer services, instructors show students how individuals and their families can use resource management to meet their material needs. They also teach students about safety and environmental awareness in relation to consumer products. Teachers emphasize the importance of approaching personal, professional, and family demands in a balanced manner. They help students develop financial literacy and critical thinking skills in addition to creative and interpersonal skills. For example, a teacher may have students in a consumer services class organize toy donations for a school project and give presentations to other students demonstrating the types of toys appropriate for different developmental levels. In this field, students learn how to function effectively as providers and consumers of services and goods, and they learn how to train others to do so as well.

In food and nutrition, accomplished CTE teachers help students apply nutritional concepts to daily living so they can promote wellness and help people lead healthy, active lives. Instructors are well acquainted with the nutritional value of foods as well as dietary guidelines for individuals of different ages and activity levels. They also understand the importance of assessing family economics and providing instruction in food safety and sanitation when implementing nutritional plans. Teachers use this base of knowledge to show students how they can meet the nutritional needs of various individuals. For example, a teacher may have students design a balanced five-day meal plan and counsel family members on food choices and portion sizes before reviewing safe techniques for food preparation. Instructors show their students how to take a comprehensive view of nutrition within the context of different social groups and personal living environments.

Cosmetology is a broad term used to describe beauty services related to the treatment and maintenance of hair, skin, and nails. Accomplished CTE teachers in this field instruct students in hair coloring, cutting, perming, and styling; facials, skin treatments, make-up applications, and hair removal; and manicures, pedicures, and nail design. Instructors help students become stylists and small business owners

by teaching them technical skills, developing their appreciation for aesthetic design, providing them with experience in customer relations, and introducing them to marketing and small business techniques.

The knowledge of accomplished CTE teachers working in interpretation and teacher training is based in education and in the language arts but varies in relation to their field of expertise. The global nature of modern life makes the field of language interpretation invaluable to the daily operation of industries across CTE specialty areas. Jobs in this career field are on the rise, and well-trained professionals are consistently in high demand. Interpreters work in spoken or sign language, while translators focus on written language. Both provide services in a wide range of school, home, business, and legal settings. Teachers in this field introduce their students to the linguistic and interpersonal skills they need to pursue further instruction and future employment. Instructors working in teacher training provide their students with a similar introduction to the field. They acquaint students with child development, behavioral management, children's literature, instructional planning, classroom assessment, and classroom management strategies so students can gain an initial understanding of the teaching profession in preparation for additional training and work experience. For example, a teacher might design a work-based learning experience that allows students to enter a series of early childhood classrooms so they can observe the implementation of different instructional methods. Accomplished CTE instructors across the career fields comprising Community Services work diligently to ensure their students gain access to work-based experiences within the learning environment and in relevant, real-world settings.

Decorative Arts and Design

Curricula within the specialty area of Decorative Arts and Design prepare students to pursue careers within **apparel design and clothing construction, ceramics and pottery, floral arrangement, interior design and decorating, jewelry making, and textile design**. Accomplished CTE instructors provide students with the technical and business skill sets they need to obtain employment in major industries or as artisans in cottage industries. Teachers introduce their students to design methods, production practices, and operational procedures that allow them to refine their craft, meet industry standards, and mature as professionals. Educators also help their students acquire the marketing and entrepreneurial skills they need to attract customers and achieve profitability and career success. While many students in this specialty area may obtain employment in commercial settings or be self-employed, others may pursue postsecondary education and find positions as historians, scholars, and curators in cultural institutions such as museums, galleries, and historic houses.

Accomplished CTE instructors who teach students about **apparel design and clothing construction** understand the many factors driving garment production and sales, from industry trends and government regulations to cultural values and consumer demands. Teachers discuss clothing and apparel as economic commodities and objects that satisfy basic physical needs while also fulfilling complex psychological desires through the manipulation of self-image and the

projection of social personae. They help students understand how media, family, friends, and acquaintances influence garment choices and thus affect fashion design. Alongside a background in these theoretical issues, educators give their students an understanding of costume history and the aesthetic principles of fashion. They teach students about design elements such as line, shape, space, texture, pattern, balance, and color and how these elements influence our emotional response to clothing. CTE instructors also show students how to manipulate the cut, drape, form, and fit of garments to complement various body types. Students learn about various aspects of the design process by sketching their ideas, revising drawings and annotating them with notes and fabric collages to hone their designs, selecting fabrics based on use and care requirements, creating and working with patterns, constructing garments using hand and machine sewing techniques, embellishing garments, and tailoring articles to make alterations and modify ready-to-wear garments. Instructors advance their students' technological expertise throughout this process by showing them how to use computer-aided design (CAD) software, sewing equipment, and tools, while observing safety protocols. They also have students explore their career options by researching the roles and responsibilities of professionals working in the apparel industry. The students of accomplished CTE teachers develop their technical and business skills through work-based learning opportunities that strengthen their entrepreneurial and marketing skills while helping them build professional portfolios in preparation for postsecondary employment.

In the domain of **ceramics and pottery**, accomplished CTE instructors teach their students about the functional and aesthetic qualities of various clays, slips, engobes, glazes, and washes while showing them various shaping techniques, decorative strategies, and firing methods. Students learn hand-building skills, such as pinching, coiling, molding, extrusion, and slab construction, as well as wheel-thrown construction, including the use of tools to trim and burnish forms. Ensuring adherence to health and safety guidelines, educators teach their students about different kiln settings and firing options as well as how to oxidize finishes and create other effects. Throughout studio work, teachers emphasize the importance of balancing form and function, showing students the significance of shape, texture, color, and pattern to meet specific purposes and convey artistic meaning. Students learn about historic design trends, such as art nouveau or art deco, to gain an appreciation of various cultural perspectives and viewpoints. They also experiment with the expression of their personal vision as they develop their skills and abilities as craft artisans. CTE teachers encourage students to showcase their pieces by building portfolios, selling their work at shows and galleries, and filling orders on a commissioned basis. They provide students with opportunities to collaborate with other artisans so students can form professional networks and establish themselves as working artisans within their communities.

Understanding the historical, cultural, and aesthetic components of floral design, accomplished CTE instructors of **floral arrangement** teach their students about the origin of popular arrangements and the effect that historical periods have had on modern styles. They train students to recognize the distinctions among classical, European, and Oriental arrangements and show them how to work with the design elements that characterize these types of bouquets. Instructors know how to create

line, mass, and line-mass designs and teach their students how to produce these arrangements while using primary, secondary, and tertiary colors to complement their overall effect. Educators evaluate scale, proportion, balance, and color usage as students learn the basic design principles of **floral arrangement**. They help students understand floral and foliage classifications as well as the tools and supplies needed to work with fresh, dried, and artificial flowers in fresh and permanent arrangements. Family and consumer science instructors in this domain convey technical knowledge and sound business practices in classroom simulations, student-run businesses, and work-based learning opportunities offered through business and community partners. Educators prepare their students for careers in floral design, whether they work in corporate settings or establish and operate small businesses.

Accomplished CTE teachers offering coursework in the domain of **interior design and decorating** teach their students about architectural styles, furniture designs, and decorating trends, both historical and contemporary. They also promote environmental awareness by acquainting students with sustainable building practices and the principles of green design. As instructors work with students, they teach them about the qualities of, and relationships between, artistic elements that affect interior design, including line, form, space, mass, and texture. Students learn how to create a sense of ambience and evoke a distinctive aesthetic by altering the balance among these elements through the use of color and lighting; the coordination of floor, window, and wall treatments; the selection of fabrics, furnishings, and decorations; and the arrangement of pieces within a room. Importantly, family and consumer science teachers show students the importance of meeting client needs by basing their design choices on the accommodation of individual lifestyles and personal tastes and the observance of economic guidelines and quality standards. CTE instructors also teach their students how to optimize traffic patterns in homes and organize interior spaces for specific uses and functions. To formulate their design ideas and communicate them to clients, students create floor plans and sample boards during work-based projects. Teachers help their students develop portfolios based on these learning opportunities to demonstrate possession of the knowledge, skills, and abilities required for careers in **interior design and decorating**.

Accomplished CTE instructors who teach **jewelry making** work with their students from the design phase through studio fabrication and then product sales. They teach students how to sketch their ideas so they can refine the structure and form of jewelry pieces prior to construction. Demonstrating safe work practices and the responsible use of media and equipment, educators introduce their students to a number of fabrication techniques, including bead stringing, wire bending and wrapping, metal stamping and surface texturing, stone setting, soldering, and riveting. They have students experiment with different media, such as gems, stones, tiles, metals, and found objects, showing students how the qualities of various materials inspire distinct emotional responses from viewers. CTE teachers analyze jewelry pieces with students, evaluating balance, proportion, color, pattern, and form to improve their students' technical proficiency and aesthetic sensibilities. Educators teach students about historical and cultural trends in **jewelry making** to expand their design influences and help them develop a sense of personal style as craft artisans. Teachers also stress the importance of learning current market trends and meeting

customer needs based on the wearers' use of jewelry and occasion for purchasing it. As students collect portfolios of their jewelry creations, instructors encourage them to pursue work-based learning opportunities and become active participants in artisan communities. CTE instructors prepare their students to pursue employment in small and large business environments and teach them the practices and procedures needed to operate small businesses.

Accomplished CTE teachers who provide instruction in **textile design** show students how to create fabric for a range of applications and a variety of markets, from the tailoring of couture clothing to the construction of mass-produced furniture and wallpaper. Instructors are familiar with the weaving and printing techniques used in textile production and teach their students to design and manufacture fabrics using both contemporary and traditional methods and technologies. Educators urge students to experiment with styles and fashions derived from current and historical trends. They have students use different fibers, yarns, dyes, and finishes to gain experience working with color, texture, and print and to practice coordinating these design elements by observing aesthetic principles related to balance, emphasis, rhythm, and proportion. Teachers in this domain encourage their students to create portfolios with their textile creations so they can pursue postsecondary opportunities.

Engineering, Design, and Fabrication

The careers in this specialty area continue to account for a significant portion of the job market because they involve the design, manufacture, and maintenance of a wide range of structures and products. Accomplished CTE instructors in this career pathway prepare students to undertake tasks as diverse as building electronics, repairing roadways, constructing buildings, maintaining and servicing power plants, and designing new products. They introduce their students to new tools and machinery, technologies and materials, processing and feedback controls, and outputs and robotics. Depending on their particular expertise, teachers are knowledgeable about engineering fields, repair techniques, manufacturing processes, transportation systems, energy technology, and environmentally safe integrations. Instructors with a command of the building trades may focus on plumbing, electrical wiring, heating and cooling systems, or carpentry, and they may also have related expertise in architecture, engineering, city planning, housing policies, or construction technology. CTE teachers working within the area of Engineering, Design, and Fabrication cultivate specific skill sets, such as prototyping, metal joining, material science, numerical controls, and safety and quality control. These skill sets fall within five major domains: **architecture and construction**, **design and development**, **engineering**, **manufacturing**, and **robotics and automation**.

All accomplished CTE instructors in this career pathway use scientific and mathematical knowledge as well as industry-mandated skills and performance standards to teach students about the application of emerging technologies. They challenge their students with interdisciplinary projects that require them to devise, troubleshoot, and modify systems using technological tools and processes. For example, a teacher might show students how to employ CAD software to produce virtual representations of cities or homes so students can examine the complexities

of construction and test the limitations of their designs prior to investing time, money, and material in building physical prototypes. Teachers emphasize the utility of adapting to the changing design, interface, and maintenance of data systems. For instance, an instructor might introduce her students to multiple numerical systems to train them in the type of computer software design arrangements they can expect when coding and decoding electrical programs. Teachers also stress the importance of adopting efficient project management principles, such as the “just-in-time” model of distributing parts where and when they are needed, thereby reducing storage requirements. Instructors expand student thinking and extend their students’ industry-based skills by teaching them how to adapt tools and techniques to solve practical problems.

To teach students how to design efficient and effective solutions in the workplace, accomplished CTE teachers introduce them to the ongoing development of inputs, processes, and outputs in communication, transportation, manufacturing, and construction systems. In the field of communications, topics include encoding, transmitting, receiving, decoding, storing, and retrieving information. In transportation, they relate to essential tasks such as loading, moving, unloading, and storing goods using multiple media. In the field of manufacturing, changing trends affect ways of locating material resources, extracting them, producing industrial materials, and fabricating products. In construction, they deal with methods of preparing sites and networks for buildings, setting foundations for structures, erecting structures and infrastructures, installing utilities, and establishing maintenance protocols. CTE teachers throughout the area of Engineering, Design, and Fabrication provide their students with an understanding of future trends and current practices to prepare them for the changing demands of the workplace.

Information Systems and Technology, Communications, and the Arts

This specialty area is a vast career cluster. Practitioners specialize in a range of fields, but the purpose of their activities centers on communication. Whether they work in **communications and journalism, fine and performing arts, information systems and technology**, or **media arts**, professionals in this pathway focus on the storage, retrieval, and conveyance of information and ideas. Accomplished CTE teachers in this area show their students how to use words, sounds, signs, and symbols to create meaning.

Accomplished CTE teachers in **communications and journalism** have a strong background in English language arts and a firm understanding of the creative process as it relates to their field. They show students how to identify messages relevant to the audience and occasion and how to communicate these messages in compelling, informative, and persuasive ways. Instructors develop their students’ critical thinking skills while honing their speaking and writing ability, showing them how to create and present columns, features, and other pieces. For example, a journalism teacher might have his students select a current issue and gather information to develop a news story that raises audience awareness; after broadcasting the story to their peers, students could reflect on its impact at the school. Capable of working in audio, video, and print media, educators provide their students with the skills necessary to analyze

and investigate topics, interact with people, and discuss current issues. They also teach students about copyright laws as well as the ethical and moral implications of working in **communications and journalism**. Accomplished teachers in this domain prepare students for careers in advertising, broadcasting, desktop publishing, web design, and public relations, in addition to technical and journalistic writing.

The teaching practice of accomplished CTE instructors in the **fine and performing arts** is grounded in the creative and expressive aspects of their work and its ability to communicate ideas and construct meaning. Providing students with instruction in painting, sculpture, music, dance, theatre, film, and photography, teachers understand elements of design and the design process. For both the **fine and performing arts**, accomplished educators know how artists analyze their purpose, research their methods, develop their approaches, select their media, create their products or performances, and evaluate their outcomes. Instructors in the performing arts also have a thorough understanding of production and performance techniques. All instructors in this domain use technology to enhance their practice and show students how to employ technological developments to advance the arts industry. For example, theatre and music instructors may train their students to use sound reinforcement technology to support and improve musical theatre productions. Accomplished teachers work with students to hone their craft as artists while learning the duties and responsibilities of arts professionals, such as observing copyright laws and advocating for the arts, among others.

Accomplished CTE teachers in **information systems and technology** have a comprehensive understanding of the design, development, and management of computer software, hardware, and networks. They know how to use the design process in their field to plan, create, and evaluate products and possess the problem-solving and technical skills needed to troubleshoot issues and devise computing solutions. For example, a programming instructor may teach students to produce interactive games, showing them how to proceed from plot development to storyboarding, the application of multidimensional visual theories, and code writing. Another teacher may have students identify the need for an application, create the program, evaluate its utility among users, and produce an update to improve its effectiveness. Instructors are adept at working with applications and systems software to manage, process, and communicate information effectively and share this knowledge based on the content they cover and the skills they address in their courses. In the field of web design, accomplished CTE instructors show students how to plan and create user-friendly websites that meet the technical requirements of host servers. They teach students about issues such as website compliance with bandwidth restrictions that determine how much traffic a site can handle. With regard to network architecture, accomplished teachers instruct students in the design and construction of data communication networks, including local area networks (LANs), wide-area networks (WANs), and intranets. Accomplished instructors across this domain teach their students about acceptable use practices in business and industry, including policies to maintain data privacy. For example, a teacher may have students research acceptable use policies from local businesses and explain how they help maintain the security and integrity of business systems. Teachers understand that practices are constantly evolving in computer applications and programming,

software development, web development and design, and networking. They develop their skills continually to meet the needs of business and industry and encourage their students to obtain industry certifications as well, all to ensure that students are equipped for, and competitive in, careers within **information systems and technology**.

In the field of **media arts**, accomplished CTE teachers combine artistic talent with technical knowledge to create computer-based graphic art, digital animation, video productions, and sound recordings, and to utilize audiovisual (A/V) and printing technology for a variety of applications. Instructors show their students how to work with software to achieve artistically satisfying and technically proficient results. For example, a teacher may have students identify the topic for a public service announcement about responsible behavior at school functions, work with different software packages to draft multimedia presentations, review the design advantages of each production, use focus groups to pilot the announcements and evaluate their effectiveness, and revise the presentations based on this feedback before airing the announcements for students. Projects for teachers and their students involve audio and visual production, including animation and special effects, for radio shows, musical tracks, theatre performances, television shows, commercials, motion pictures, computer games, and software. Instructors provide their students with exposure to a wide range of projects in preparation for careers throughout business and industry.

Accomplished CTE teachers providing instruction in Information Systems and Technology, Communications, and the Arts recognize that the professions within their specialty area are constantly evolving. Existing career fields are always changing, and new fields often appear on the scene. Instructors prepare students for the dynamic nature of their chosen industries by challenging them with authentic, work-based assignments that require students to confront problems and adapt to project modifications in fast-paced settings. Students build their workplace readiness and project management skills while honing their technical and artistic abilities to create products and services that balance practical communication with aesthetic expression. Accomplished teachers draw on expertise within their field, as well as the general knowledge that informs their practice, to help students develop flexible skill sets for a variety of exciting careers.

Leisure and Recreation Services

Accomplished CTE teachers in the rapidly expanding specialty area of Leisure and Recreation Services prepare their students for careers in **culinary arts, entertainment management, event marketing, food and beverage service, hospitality and tourism**, and **sports management**. Teachers have a broad knowledge of business functions related to resource and information management, communications, and customer service, which they couple with technical skills within their field of expertise. In **culinary arts**, as well as **food and beverage service**, technical skill sets include the use and care of equipment and technology, food and beverage safety and sanitation, product costing, and preparation and service methods in domestic and commercial settings. In **hospitality and tourism**, technical skill sets include guest

and client services, facility management, staffing and training needs, and industry regulations. The skill sets necessary for success in **entertainment management**, **event management**, and **sports management** include client procurement, logistics, merchandising, marketing, and contract management.

Using project-based and experiential learning strategies, accomplished CTE teachers help students develop skill sets that combine an understanding of business practices with knowledge of technical methods. For example, a family and consumer science instructor who teaches **culinary arts** may yoke an exercise on the proper handling and storage of perishable foods with a discussion of inventory and cost control procedures in professional kitchens. In this example, the teacher embeds the subject of resource management within coverage of industry-mandated public health guidelines to prepare students for the demands of the workplace. Similarly, a lodging instructor may have students demonstrate the most efficient way to clean a hotel bathroom, or a sports management instructor may have students present a mock sales pitch to acquire an all-star point guard as a client. In both instances, students exercise their technical abilities while developing their communication skills—to train other housekeeping staff in the first example and to establish a productive client relationship in the second. CTE instructors provide their students with a range of opportunities to practice complex skill sets within authentic, dynamic, work-based settings.

Accomplished CTE teachers working within the career cluster of Leisure and Recreation Services foster the entrepreneurial creativity of their students as well by working with them to design business plans and strategize sales and marketing presentations. So, for example, an instructor teaching **food and beverage service** may ask students to present a business plan for a full-service restaurant as part of an integrated, end-of-course project, while an instructor of **entertainment management** may have students make presentations pitching different ideas for a multi-day music festival at a local fair ground. CTE instructors not only help their students acquire business and technical skills, but also assist them in promoting these skills to find—or create—job positions within their chosen career. In classroom simulations, student-run businesses, and other work-based learning opportunities, teachers provide their students with experience in every aspect of business design and implementation within their career fields to help them become successful professionals.

Natural Resources

Accomplished CTE instructors in this specialty area teach courses in agriculture, food, and natural resources. They have an in-depth understanding of life science and possess industry-specific knowledge related to commerce, communication, economics, entrepreneurship, finance, and policy within the realm of Natural Resources. The coursework that these teachers provide is often classified within seven broad categories: **agribusiness systems; animal systems; energy systems; food products and processing systems; natural resource systems; plant systems; and power, structural, and technical systems.**

Accomplished CTE teachers in these diverse groups understand the contributions that each one makes to the study of Natural Resources and are familiar with the career opportunities each provides. **Agribusiness systems** focuses on the legal and business management of agricultural organizations, including communications and public relations. This field positions students for careers as farm managers, commodity traders, advertising specialists, policy makers and other roles in the field of agriculture. **Animal systems** relates to the production, husbandry, and management of companion animals and livestock, leading students to such careers as veterinarians, livestock producers, or fish hatchery managers. **Energy systems** addresses the sustainable production and distribution of resources that fuel our country as well as their economic and environmental impact, which may guide students to careers as geophysicists, wind turbine technicians, blast explosives specialists, or mining managers. **Food products and processing systems** relates to the development of food products, processing and packaging methods, food safety, and food security. Teachers in this field prepare students for careers as laboratory technicians, quality control managers, and food chemists, to name a few. A focus on **natural resource systems** involves the stewardship, conservation, and management of natural resources, wildlife, forest lands, and other ecosystems, including public lands such as parks and wildlife refuge areas. An emphasis in this area helps students pursue careers as habitat specialists, forest rangers, soil conservationists, and arborists, among others. **Plant systems** concentrates on the science of producing, marketing, and utilizing fruits, vegetables, grains, fiber, flowers, and ornamental plants, leading students to such careers as landscape designers, florists, nursery growers, or food and fiber crop producers. Finally, the study of **power, structural, and technical systems** involves the engineering, mechanics, and development of agricultural- or energy-related equipment and structures such as grain bins, silos, or mine shafts. In this field, students are trained to begin careers as land developers, engine mechanics, and agricultural equipment technicians, among others. CTE teachers in the career cluster of Natural Resources have a broad understanding of all seven groups and technical expertise in at least one of them.

Practical experience informs the perspective and craft of accomplished CTE teachers working in Natural Resources, enabling them to educate students in the technical skills and content pertaining to their fields as well as the professional issues and outlooks relevant to their specialty area. The subject matter knowledge of these teachers is grounded in the history of Natural Resources as a career pathway, framed by an appreciation for the social and political factors that have influenced its development and tempered by an awareness of contemporary issues and emerging technologies likely to affect it in the future. Accomplished CTE teachers are aware that topics related to the industries within Natural Resources can be controversial. Educators are well versed in both sides of controversial debates and practiced in delivering unbiased information. When teaching students about animal rights and welfare, for example, a teacher may facilitate a group discussion in which students research both sides of a debate and cite sources supporting each viewpoint. Alternatively, while addressing the environmental impact of using natural resources for plant or animal production, an instructor might have different teams deliver oral presentations that provide information without making any judgments so students can form their own opinions based on multiple perspectives. Teachers make sure

their students understand all aspects of critical issues so they can draw their own conclusions as they develop their knowledge of the area. Accomplished instructors provide their students with a well-rounded education in Natural Resources to prepare them for high demand jobs within thriving industries that help form the backbone of the nation's economic system. These industries drive local, state, national, and global markets by supplying the materials and products used for food, fiber, and shelter.

Transportation Systems and Services

Accomplished CTE teachers in Transportation Systems and Services specialize in vehicle mechanics and transportation networks. Training in this career pathway provides students with the experience they need to pursue careers as automotive technicians, aviation pilots and mechanics, heavy equipment operators, collision repair specialists, and warehouse managers, among others. CTE teachers offer coursework in **automotive maintenance and repair, automotive technology, aviation maintenance and flight, collision repair, diesel technology, health and safety management, heavy equipment operation, logistics, risk management, transportation operations and infrastructure management, transportation regulations, and warehousing and distribution.**

For accomplished CTE instructors working in this career cluster, the general scope of their knowledge encompasses all fields, while their realm of expertise lies in a detailed understanding of business enterprises in at least one domain. Thus, an educator who prepares students for careers in **diesel technology** may also have a sufficient knowledge of **automotive technology** to teach a course or two in this field. Taken as a whole, teachers who instruct students in Transportation Systems and Services use scientific and mathematical principles such as electrical theory, standard deviation, and basic algebra in their technical work. For example, in a lesson on maximizing the number of products that can be transported in a single semi-tractor trailer load, students may learn to calculate volume and weight distribution to ensure stability as well as cost efficiency. Instructors provide students with a strong interdisciplinary background as well as a thorough understanding of the tools, techniques, performance standards, and technological advances endorsed by their industries.

Accomplished CTE teachers understand the driving issues and ideas that span this sector of the market, such as new and emerging materials and technologies, advanced computer applications, leading theories about processing and feedback control, entrepreneurial developments, and economic outlooks. They share these trends with their students while addressing current workplace demands. For example, an instructor may take her class on a field trip to a warehouse facility so students can observe the latest computer inventory systems used to monitor the flow of goods and materials. CTE teachers strive to introduce their students to state-of-the-art developments, and stay abreast of trends in the sector, especially in their field of specialization. For instance, an automotive technology teacher may have a general acquaintance with advancements in logistics while possessing an in-depth understanding of the latest methods for inspecting vehicles and running diagnostic tests, as well as a thorough knowledge of recent changes in fuel efficiency guidelines

and emissions regulations. Accomplished CTE teachers have a keen grasp of the technical knowledge and industrial awareness their students need to achieve professional success in the area of Transportation Systems and Services.

Standard IV

Learning Environments and Instructional Practices

Accomplished teachers design contextualized learning environments that foster critical thinking, creativity, leadership, teamwork, and communication skills while training students for postsecondary education and careers.

Accomplished career and technical education (CTE) teachers create environments that are conducive to lifelong learning, with work-based activities and professional opportunities that captivate their students' attention and engage their minds. Teachers recognize that academically rigorous, instructionally relevant activities stimulate curiosity and inspire a passion for learning that motivates students to explore and extend their knowledge. CTE instructors sustain this level of excitement by expressing enthusiasm throughout the learning process and nurturing their students' interests through real-world connections. Accomplished teachers foster their students' autonomy as well by providing them with opportunities to reflect on their intellectual and emotional development. Instructors establish objectives that have clearly defined criteria for success and invite students to evaluate their levels of mastery and identify areas they would like to strengthen. Accomplished CTE teachers know that when students help to assess their own progress, they gain accountability for their learning, feel empowered, and become proactive.

Accomplished CTE instructors encourage their students' ownership of the learning process and engage them further by involving them in the formulation of classroom rules, procedures, and expectations. Teachers manage their learning environments safely and efficiently while developing their students' leadership and teamwork skills. Students gain personal confidence while developing the knowledge, skills, and abilities they need through independent and collaborative work that supports strategic risk taking and cultivates democratic values. Accomplished teachers work with their students to recognize the attitudes and demeanors that will and will not serve them well in the classroom and lab, or in a professional establishment. CTE instructors help their students achieve these educational objectives by contextualizing their learning within a series of projects aimed at increasing their intellectual maturity and functional independence. As students progress from the middle to high school level, the learning environment supports their growth by extending from classrooms and labs to the inclusion of career and technical student organizations and other related student groups, as well as supervised occupational experiences. Classroom and lab work may dominate instruction at middle schools, with teachers leading the

facilitation of student organizations, but by high school, students should assume greater responsibility and become increasingly self-reliant in preparation for their postsecondary careers. Accomplished teachers ensure that work in all aspects of the CTE learning environment shifts from teacher-led to student-led as much as possible during this progression.

Contextualizing Education Within the Learning Environment

Accomplished CTE instructors consider the content knowledge they impart, the learning environments they create, and the instructional practices they use to be interrelated components of the same teaching dynamic, all geared toward the intellectual and emotional development of well-educated, technically capable professionals. Content knowledge is thus always contextualized, always purposeful based on this goal—the learning environment is structured to provide that context and reaffirm that purpose—and the instructional practices are defined by their attention to and movement between the creation of the learning environment and the delivery of content knowledge. The evaluation of one component inevitably evokes the other two, and the description of all three conveys the energy and drive of the CTE learning experience. (See [Standard X—Reflective Practice](#).)

The applied learning environment is the hallmark of career and technical education. Accomplished CTE teachers contextualize learning experiences by focusing student investigation and discovery in authentic work situations. They achieve this goal in various settings, including classroom simulations, workplace labs, and occupational placement outside the school (e.g., on-the-job training, apprenticeships, clinical internships, or service-learning projects). Teachers use project-based activities to challenge their students, encouraging them to develop new skills and acquire new knowledge through hands-on practice. Students who design and produce deliverables such as electric vehicles gain expertise by working together as efficiently and effectively as possible to solve technical problems and address workplace issues. Learning activities are geared toward empowering students by strengthening their ability to think critically, work collaboratively, negotiate strategies, and make decisions while demonstrating leadership and teamwork. Instructors observe student performance and evaluate project outcomes to assess their students' mastery of learning objectives and determine the status of their technical competency. Accomplished CTE teachers structure their classrooms and labs based on the demands of high-performance workplaces and the practice of successful professionals.

The paradigm of applied learning is driven by the desire to engage students and foster their command of cross-disciplinary and industry-specific knowledge, as well as their grasp of transferable or employability skills. Accomplished CTE teachers believe it is their responsibility to develop all aspects of their students, encompassing academic, professional, social, emotional, and ethical growth. The CTE learning environment is specifically designed to cover all these areas. Teachers cultivate their students' progress on all fronts by addressing student interests dynamically and approaching instruction deliberately, based on the way students learn best—in

context, with their hands and minds actively involved and engaged in meaningful and significant tasks. Educators design projects that require students to draw on their understanding of different disciplines as they use the strategies and techniques necessary to create project plans, overcome technical obstacles, meet project requirements, and deliver successful results to their work supervisors, or instructors. Educators challenge their students to build their knowledge—and reflect on their attitudes—so that students can improve their skills and abilities while evolving their values and beliefs from project to project. Teachers tailor their instruction in response to their students' perceptions of what is real and relevant at the moment and what is pertinent to their future—a message that places high value on student initiative and creativity. For instance, an engineering instructor and a landscape design teacher may work collaboratively and address their students' desire for a skate park by creating a joint project requiring students to use their knowledge of form and function to develop a public space they could use. CTE instructors guide students to question and explore their world with a sense of purpose—to experiment with various methods of creating finished products, to practice working cooperatively and productively in teams, and to gain control of the outcomes they achieve.

Accomplished CTE teachers implement and modify their instructional practices to empower students as they take this journey of self-discovery through the learning environment to the world of work. The pedagogical choices teachers make depend on the learning goals of their students, the technical demands of their instructional activities, the dynamics of their individual learning environments, and the personal characteristics of their students. As teachers plan their approach to learning activities, they are attentive to their students' progress within a lesson or unit, recognizing when projects need to move from classrooms to labs or other workplace settings for students to attain optimal skills. For instance, a masonry instructor whose students have mastered repointing in the classroom may take her students to a private residence so they can practice their skills on site by fixing a damaged wall. Accomplished CTE instructors know how to move between the different areas of their learning environment to supply rigor, deepen conceptual understanding, and instill a true appreciation of industry demands. They maintain a flexible approach to instruction, allowing learning content and student dispositions to guide their strategies and using student responses and teaching experiences to inform their modifications. Accomplished teachers understand there is an ongoing dialogue between the pursuit of learning objectives and the management of learning environments—one consideration always affects the other. Attuned to both, instructors are adept at adjusting their pedagogical techniques to meet learning goals and improve student outcomes while engaging students in various environments and advancing their postsecondary readiness.

By altering their methods of instructional facilitation, accomplished CTE teachers help students become well rounded within their chosen career fields. Different areas within the learning environment require different teaching methodologies. CTE instructors know how and when to transition from direct to indirect supervision so students can work as autonomously as possible. For example, in a mechanics or construction laboratory in which students use power tools, a teacher is required to supervise students at all times to ensure their safety; however, a theatre instructor

is free to use guided supervision and may have a student manage the technical aspects of a stage production as the light board operator while the teacher circulates between the stage and the booth. Similarly, a family and consumer science instructor who teaches food services may allow students to complete food preparation and packing on their own for a catering assignment. While these modes of operation are fairly typical within these settings, accomplished teachers use them as opportunities to advance the understanding of their students by stressing the importance of learning to act on their own as responsible professionals. So, for instance, a teacher might model her lab environment on a real-world scenario in which members of an organization are cross-trained to perform various tasks; one group might serve as safety officers, monitoring their peers' adherence to safety guidelines, while another group may conduct quality assurance and quality control checks on the equipment being used. Setting up the lab as the teacher has in this example may require time and training, but doing so engages students in the maintenance of a safe and secure learning environment, teaches them the value of cross-training employees, shows them the benefits of working collaboratively, and allows them to take ownership of lab activities, all while freeing the teacher to provide more one-on-one coaching as needed during lab exercises. Accomplished CTE teachers manage their learning environments strategically, thinking about how a single decision or set of decisions can advance logistical and instructional goals on multiple levels.

Accomplished CTE teachers ensure that classroom expectations are closely aligned with workplace demands so students learn how to meet industry guidelines and performance standards as well as technical job requirements. With this understanding in place, instructors remain receptive to student interests and ideas and encourage students to demonstrate initiative in the learning environment. Instead of serving as the sole source of authority or expertise in the classroom and lab, teachers allow their students to take on leadership roles and contribute to the generation of educational experiences. For example, a journalism instructor may appoint students to serve as editors of the school's literary magazine to promote the acquisition of the leadership skills they will need to be successful in their chosen industry. Educators encourage the development of positive, productive behavior by entrusting their students with increased responsibility as they gain new understanding and experience. Teachers focus on the learning process as much as instructional content, aware that a collaborative, stimulating, and challenging learning environment significantly enhances student performance and growth. They help students identify how and when they best learn as well as what they need to learn and why they need to learn it. To establish this kind of thoughtful, introspective learning environment, teachers initiate two-way communication based on trust and mutual respect. They encourage students to increase their level of interpersonal awareness and social maturity so they can express their preferences and learning needs cooperatively, knowing that the interests of their peers might differ. For example, a teacher might urge a student who refuses to work with team members to think about his behavior, consider the adverse effect his reluctance might have on future employability, and decide what he could do to achieve a better outcome. CTE teachers are resourceful, using behaviors detrimental to career success as learning opportunities to guide student reflection where and when appropriate. They address issues and concerns

with their students in an ongoing manner, using their knowledge of students to advance the social, intellectual, and emotional development of all learners.

On a daily basis, accomplished CTE teachers address the diverse learning needs of individual students while working with all students to meet the general goal of achieving postsecondary readiness. This is a notable accomplishment, since students in a classroom may simultaneously engage different tasks in different ways—individually, cooperatively, in small groups, or in the context of a whole-class project. Throughout these activities, teachers empower their students by making them feel valued as individuals. They appreciate the unique challenges that students face and anticipate situations that might disrupt classroom activities or impede a collective sense of purpose and enthusiasm in the learning environment. CTE instructors minimize instructional difficulties and group students so they can help each other while advancing their own learning goals. For example, an upholstery teacher may pair a student with dysgraphia who has highly developed motor skills with one who is mathematically adept but less dexterous so they can work together to strengthen their weaknesses as they calculate yardage and cover a chair. Accomplished CTE teachers create learning environments that provide students with valuable opportunities to work with their peers and enable them to reach their learning objectives. Through the teaching strategies they adopt in their learning environments, CTE instructors continually reinforce the importance of working collaboratively to achieve complex goals. They create learning environments that promote fairness and cooperation, recognize and reward quality work, and utilize constructive feedback to inspire students.

Empowering Students as Autonomous Learners

Accomplished CTE teachers are passionate about their professional fields and driven by their love of learning. They convey enthusiasm to their students and cultivate a similar sense of excitement in them, establishing a culture of proactive inquiry that encourages curiosity, supports learning, and leads to student growth. CTE teachers urge students to take risks, ask questions, and explore answers so students can acquire knowledge, take pride in their discoveries, and develop their areas of professional interest. Instructors achieve this goal by designing projects that evolve with their students. Rooted in student interests, these projects gain complexity and depth through student feedback and teacher guidance. For example, a visual media instructor might teach students the fundamentals of photography and end the course with a photo shoot requiring students to demonstrate mastery of lighting and composition issues that challenged them along the way. CTE teachers structure the learning process so students can reflect on their needs and desires in consultation with their teachers as they become fully invested in their educations. To demonstrate the importance of lifelong learning and strengthen their common interests, teachers describe the intellectual activities that they pursue as well, whether these activities take place inside or outside the learning environment. Throughout this process, teachers support their students' investigation of industry-specific, cross-disciplinary, and general academic questions, fostering their growth as individual thinkers with unique learning styles and educational goals.

Accomplished CTE instructors understand that thoughtful risk taking can help students gain invaluable experience as thinkers while building their confidence as future professionals. They therefore encourage students to take learning risks that will cause them no physical harm. Educators allow students to try out their ideas even when they know students have not chosen the best way of achieving their goals. Experiments like these allow students to obtain a deeper understanding of the skills and abilities they are acquiring. Letting students make mistakes before engaging them in reflection helps them realize why one method may work better than another—not only in the immediate situation but in related situations as well. For instance, a horticulture student trying to optimize seedling growth might use a rich soil mix that promotes fast germination but produces tall, lanky seedlings; after discussing the situation with her teacher and considering the scientific rationale for the results she achieved, the student might have a more thorough understanding of how to amend the soil and produce a better mix in the future. To extend student knowledge, teachers strive to remove barriers from the learning process and invite their students to initiate discussions and address issues, even controversial ones. For example, an advertising instructor may facilitate a debate regarding the appropriateness of marketing prescription drugs directly to consumers. Importantly, CTE teachers try to make sure their students feel comfortable expressing themselves in the learning environment so they are neither afraid of taking risks nor ashamed of making mistakes.

While empowering students to take charge of their education, accomplished CTE teachers instill the importance of intellectual discipline as well. They push themselves, their colleagues, and their students to think rigorously and act decisively to improve learning outcomes. CTE instructors model a strong work ethic in everything they do, from the careful attention they bring to classroom instruction to the “can do” attitude they take with students and way they overcome learning challenges. When students are ready, instructors transition from more prescriptive to less prescriptive methods of facilitation to help students develop into creative, mature thinkers capable of pursuing independent learning. For instance, an instructor in a teacher preparation program may initially facilitate tutoring sessions with a student, but by the end of the course may opt to observe the student instead and reflect with her afterward regarding instructional methodologies. As students grow and succeed in their work, accomplished CTE teachers encourage them to assume leadership responsibilities and take greater initiative.

Maintaining a Safe Learning Environment

Accomplished CTE teachers ensure that their learning environments are both physically and emotionally safe for all students and thus capable of supporting their growth and development. Instructors approach this responsibility in a deliberate and proactive manner, establishing clear expectations for classroom activities and interactions, teaching students how to use equipment and materials safely, and establishing classroom cultures in which students treat each other respectfully and professionally. Accomplished CTE teachers set high standards of conduct for their students throughout the learning process.

CTE classrooms, labs, and worksites are often filled with machinery, equipment, and materials that could be dangerous to students or cause property damage if used improperly. Safety instruction is thus central to career and technical education programs. Accomplished CTE instructors not only require their students to understand and demonstrate competence in safety protocols, but also cultivate their students' ability to take leadership roles when it comes to maintaining safety. For example, an instructor might assign students safety monitoring responsibilities or have students teach their peers refresher lessons on specific safety steps and processes. Accomplished teachers ensure that students with exceptional needs can also participate fully and safely in their programs, and they work with students and their support teams to identify the best ways to accommodate students' needs without placing undue restrictions on their participation in class activities. For instance, in an event management class, students with exceptional needs who are acting as servers in a simulation of a fast-paced sports concession facility may be paired with mentors who help them complete tasks while remaining as neutral as possible—one student with a cognitive impairment might repeat orders verbally so her mentor can write them down, while another student with a hearing issue may have his mentor repeat orders so he can write them down. Alternatively, an automotive technology teacher working with a student in a wheelchair may strategize different ways for the student to complete work tasks, adjusting the position of the car lift as needed to maximize the student's upper body strength and help her reach repair sites safely. CTE instructors obtain the learning resources they need and create meaningful accommodations to provide students with access to the same learning opportunities as their classmates while safeguarding them from potentially dangerous or overwhelming situations.

Accomplished CTE teachers understand it is essential to protect students' emotional safety as well as their physical safety. Therefore, they take multiple steps to ensure their learning environments are free from harassment, bullying, intimidation, social aggression, and exclusion. Instructors work with their students to establish class rules and guidelines for interpersonal communications and enforce these expectations consistently. They teach and model the importance of valuing differences and communicating respectfully, designing lessons and activities that reinforce these principles. For instance, a counseling teacher who has a gifted student with high verbal acuity but weaker communication skills may allow the student to use pre-scripted note cards during mock counseling sessions so she can develop therapeutic rapport among her peer group. Accomplished educators create inclusive learning environments, in which students with exceptional needs and students from underrepresented groups are accepted members of the class community, treated fairly, and never marginalized. To determine whether all students feel comfortable, respected, and welcome within the learning environment, teachers supplement their perceptions and observations with regular one-on-one conversations. They ask students whether they are facing any challenges and work with them to resolve problems as necessary so students feel valued as full participants in the learning community. (See [Standard II—Responding to Diversity](#).)

Utilizing Technology in CTE Programs

Electronic devices and software can automate safety procedures, increase the speed of process-driven applications, store data, and help students research and share ideas. Accomplished CTE teachers employ technology to support student learning, and they address it as a topic of instruction. CTE instructors are skilled at integrating technology seamlessly within their learning environments.

Accomplished CTE instructors use a variety of tools to manage their classrooms and labs effectively and monitor student growth efficiently. For example, some CTE teachers may upload manuals to mobile devices so students have immediate access to the safety warnings, operating procedures, and maintenance information they need; others may use tracking instruments so students can register their information and check out bar-coded equipment in an orderly manner. Software used to create, administer, and score educational assessments may also allow teachers to evaluate their students online, refine their instruction based on the analyzed data, and reflect with students in a timely manner. For instance, a teacher may employ audience response technology as part of a formative assessment to monitor student understanding during instruction. Accomplished teachers may involve students in data tracking as well. For example, in a middle school information technology class, an instructor may have students record their weekly typing speeds by creating and updating a computerized spreadsheet of the data. Graphs, charts, and other visual aids used to store and present information related to student performance support long-term statistical measurement and facilitate conversations with colleagues, students, and their families.

Sharing information related to program activity allows accomplished CTE teachers to involve their stakeholders in the educational process in meaningful ways. Instructors understand how to protect student privacy while increasing the transparency of data collection and analysis by using aggregated results as appropriate. They utilize technology responsibly to extend learning communities for the purpose of improving student outcomes. For example, CTE teachers may employ mobile tracking, real-time document sharing, or video conferencing to work with documents or spreadsheets during meetings and conferences; they may also set up notification systems to provide educational partners with fast, reliable communication of significant events and alerts. The tools available in collaborative networks help teachers remain connected even if they work in remote locations. Technology facilitates the dissemination of best practices among all educators, allowing them to promote student needs and interests as advantageously as possible.

Within the learning environment, accomplished CTE teachers model digital literacy and creativity for their students, encouraging them to practice and experiment responsibly to improve their facility with technology. Instructors urge their students to take an inductive rather than a deductive approach to the selection of appropriate technology, so students base their conclusions on specific advantages and disadvantages of working with one form of technology over the other. While doing so, teachers emphasize fundamental aspects of digital citizenship, showing their students the principles of ethical behavior on the web and the “netiquette”

they should observe when communicating and collaborating online. To accomplish these objectives, teachers begin by identifying technological resources available to their students. For example, a business, marketing, and financial services instructor who specializes in e-commerce may facilitate a project in which students design, construct, and maintain a website using online tools. Or a theatre teacher may show his students how to age their faces digitally so they have older models of themselves for the application of “old age” stage make-up. Accomplished teachers guide their students as needed while allowing them the freedom to explore technology on their own as they advance their learning through project-based experiences they help to design. For instance, a CTE teacher may have film students investigate lighting and sound solutions to learn the benefits and drawbacks of different technologies and determine the options they prefer given their set location, scene, time of day, and weather conditions. Field experience outside the classroom or lab, online or otherwise, represents an important way of learning about technology. As with all aspects of their education, CTE instructors support and encourage their students to become autonomous, independent learners.

Accomplished CTE teachers create stimulating learning environments that challenge students with compelling projects and give them real world experiences that will prepare them for postsecondary opportunities and demands. By providing their students with attention, affirmation, and affection, instructors inspire them to work at their full potential, take responsibility for their own educations, and develop into lifelong learners. Through rigorous and relevant instruction, teachers motivate their students further by generating enthusiasm for the journey to college and career success. Educators foster intellectual curiosity on all fronts so that students become well rounded and self-reliant. Implementing organizational structures and teaching practices that target the needs of individuals while enriching group dynamics and encouraging teamwork, CTE instructors help their students become mature, self-reflective learners and versatile, capable professionals.

Standard V

Assessment

Accomplished teachers design and implement a variety of valid and reliable assessments that allow students to provide an authentic demonstration of their knowledge and skills and help them establish goals to guide their technical and professional development.

Accomplished career and technical education (CTE) teachers utilize a variety of assessment methods, both quantitative and qualitative, to obtain meaningful information about students' prior experiences and current knowledge. Educational assessments help instructors gauge student progress and evaluate where students are in the learning process. To support the demonstration of student achievement, teachers review their assessments carefully and provide their students with accommodations as required. Cognizant of their students' learning styles as well as their needs and interests, teachers select, design, and modify assessments based on the skills and behaviors they are measuring and the educational purpose for gathering these data. Accomplished teachers formulate strong rationales regarding how, when, and why to administer assessments in the CTE learning environment. They use assessment data to assist students as they reflect on their academic progress, to refine teaching practices based on their students' changing needs, and to advocate for their programs.

Designing Valid and Reliable Assessments

Accomplished CTE teachers are adept at using different types of assessments, integrating ready-made and teacher-developed examinations meaningfully throughout the learning process. Formative evaluations help them measure their students' prior knowledge and track their students' progress within a unit of study, as learning takes place. Accomplished teachers know how to maximize the diagnostic potential of these assessments to determine the changing status of student ability and knowledge. They use baseline assessments, or "pre-tests," to gauge student understanding prior to instruction, employing these evaluations to survey students quickly and confirm the best starting point for a course. Teachers administer other instruments as well to make formative judgments during any phase of instruction. For instance, a teacher may observe students to determine misconceptions taking place in the classroom or to gauge shifts in conceptual understanding while students work in the lab; the teacher may also apply a rubric or scoring guide to the assignments that students submit so she can identify ideas requiring further discussion in future class sessions. Accomplished teachers assess student learning continuously and purposefully to determine when and how they should remediate or accelerate

instruction to support student achievement. Instructors do so both informally, during classroom observation and discussion, and formally, when reviewing their students' completed work. At the end of units and other milestones throughout the year, teachers utilize summative measurements such as student portfolios, semester projects, and industry certification or licensure examinations to evaluate the cumulative impact of instruction on their students' content knowledge and technical competency.

By using assessments that connect academic instruction with real-world experience, accomplished teachers support the curricular goals of the CTE learning environment. For example, a health educator might administer a performance-based assessment that requires students to check patients' vital signs so he can evaluate his students' higher order critical thinking skills as they resolve a problem-based scenario in an authentic medical context. CTE teachers select the assessment method that best suits their purpose given the skills, abilities, and outcomes they are evaluating and the business demands of the workplace. Instructors align the content of their measurements with relevant educational and professional learning objectives and standards. For example, an automotive technology teacher who wants students to demonstrate proficiency replacing brake discs, or rotors, may design a performance-based test requiring them to complete this task; to evaluate his students' theoretical understanding of the brake system, the teacher may later choose to administer an essay exam asking students to explain design principles and their impact on practical automotive maintenance. CTE instructors ensure there is a strong conceptual match between the structure of the assessments they use and the content being measured.

Accomplished CTE teachers understand the importance of selecting, designing, and administering valid and reliable tests. They use valid assessments to make decisions related to targeted outcomes, ensuring that the content and construction of their measurements can support their evaluation of student skills and behaviors. For instance, a culinary arts teacher who has students demonstrate their ability to prepare sauces may observe them deglazing a pan to incorporate fond in a pan sauce or may watch them thickening a roux to make a béchamel; to provide her students with useful feedback about sauces, the instructor would focus her attention on techniques like these rather than methods to achieve specific meat temperatures or strategies for measuring flour. Accomplished CTE teachers review examinations to make sure they meet their pedagogical purpose in the learning environment. Instructors analyze their feedback methods as well, basing them on professional standards to characterize performance as reliably as possible across student groups. For example, an accomplished CTE instructor might use industry mandated guidelines to make a rubric more objective so a team of qualified teachers can reach scoring consensus and compare student performance on an examination administered in different classes. CTE teachers carefully monitor issues related to the validity and reliability of their classroom assessments.

When selecting and designing assessments, accomplished CTE teachers obtain stakeholder input to confirm they are measuring content in accordance with industry and academic guidelines. Instructors actively engage advisory boards, educational and professional colleagues, and postsecondary college and business partners as

necessary and appropriate. For example, a high school drafting instructor might communicate with partners at the college level while developing tests that evaluate his students' ability to produce paper-and-pencil and computer-assisted designs. Similarly, a dance teacher might work with a physical education instructor to create an examination about the computation of body mass index and its significance. CTE teachers recognize that external and internal stakeholders can help them align assessments with industry expectations and school curricula while measuring student proficiency within career areas. Instructors use their networks of educational and business partners to vet the assessments they administer in the learning environment and guarantee that their examinations are based on the most current and authoritative professional knowledge possible.

Accomplished CTE teachers modify their assessments to accommodate individual learners and ensure that all students have the opportunity to demonstrate the skills and abilities measured in the learning environment. For example, an instructor might have a student with a learning deficiency in written communication respond orally to an essay test if composition is not the technical skill she is evaluating. Or a teacher may create alternative versions of an examination to target students at different reading levels while retaining the rigorous quality of the test content across all versions. To reduce bias and promote fair testing, CTE teachers avoid situations that might disadvantage students based on linguistic or cultural differences. For instance, a construction technology teacher may change the word “stoop” to “porch” on a test to accommodate her students' regional dialect and ensure that word choice does not impede their demonstration of technical understanding in relation to house design. Accomplished CTE teachers adapt assessments based on their knowledge of students' exceptional needs and cultural backgrounds, as well as their learning styles. Educators provide students with various opportunities to exhibit their proficiency based on their learning modalities. For example, an automotive technology instructor may ask students to assess engine performance based on software diagnostics versus physical examination and anecdotal discussion with a customer. Similarly, a family and consumer science instructor who teaches culinary arts may have students dice or chop fruits and vegetables in a range of sizes to demonstrate their knife skills—and then have students evaluate their classmates' performance in relation to the uniformity of their cuts. Assessing students in different manners, with sensitivity to their educational experience and individual characteristics, allows accomplished teachers to attain the fullest appreciation of their students' skills and abilities.

Utilizing Assessment Data

Accomplished CTE teachers maintain a strong focus on the educational purpose of assessment—to provide students with detailed information regarding what they know and how they may extend the breadth and depth of that knowledge. Instructors therefore sequence assessments based on their students' prior knowledge and future learning goals. Teachers analyze the assessment data they collect, interpreting it so they can engage students in substantive discussions about their strengths and weaknesses as well as strategies to enhance their learning. For example, a teacher may design a baseline assessment to measure a range of technical skills that potential employers would value in order to map student knowledge, discuss

teaching goals, and plot the course of future learning in collaboration with students; the teacher may then return to this assessment throughout the semester to keep students involved in the measurement of their own growth. CTE instructors compare current and historical data to determine trends in student achievement. They take this information into consideration when conferring with students and reviewing the pace, sequence, and delivery of instruction for current and subsequent school years. By making constructive use of assessments, CTE teachers adopt a fair and balanced approach to student learning that demonstrates a genuine desire to help students do well in the spirit of teamwork.

Accomplished CTE teachers empower their students to engage in the type of self-reflection that leads to self-efficacy. To this end, they discuss every aspect of the assessment process with their students, clarifying methods of evaluation and criteria for analyzing performance. Educators provide their students with clear, concise feedback and thoughtful, supportive guidance regarding how students can improve their skill sets. During these discussions, teachers listen carefully to students, taking their views into consideration to devise intervention strategies that complement their learning styles, assessment experiences, and career goals. Accomplished teachers show students how they can use classroom assessments to evaluate their progress toward academic and professional goals such as meeting higher education admission requirements, pursuing postsecondary credits, satisfying job licensing requirements, earning industry certifications, and obtaining employment. By making students participants in the analysis and interpretation of assessment data, CTE teachers provide them with the tools they need to take charge of their growth across all subject areas.

Accomplished CTE teachers know that assessment data can provide valuable feedback to teachers as well as their students. They analyze this information and use it to evaluate their pedagogical approaches, formulate instructional responses, and plan future professional development. For instance, a broadcasting instructor may analyze the news recordings his students submit to reevaluate the structure of the assignment and its location within the syllabus. Or an accounting teacher may decide to reinforce certain concepts within a spreadsheet lesson due to the results of an assessment that indicate her students need more time reviewing the use of multiple formulas. Finally, a business technology teacher who has identified web page design as an area requiring improvement based on her classroom experience may attend a workshop on current scripting languages. Teachers modify and adapt their practice based on this type of analysis, comparing classroom goals with student outcomes so they can identify gaps and determine how they can address any shortcomings to improve student learning. (See [Standard X—Reflective Practice](#).)

Importantly, accomplished CTE instructors also use assessment data to strengthen advocacy efforts and communicate with stakeholders on behalf of their students. For example, a teacher might employ winning results at a career and technical student organization competition to convince business and community partners that their financial investment has proven successful and that additional resources would allow students to become even more productive. Instructors publicize examples of high

performance on industry-recognized assessments to validate stakeholder grants and attract further resources for CTE programs. Teachers use the data they gather about student performance to support articulation and dual credit agreements as well. For instance, a teacher may share aggregated assessment results and student outcomes with postsecondary institutions to help demonstrate that instruction in his class meets the same challenging requirements as a comparable college course. Educators utilize assessment data to foster their students' educational goals by advancing the continued growth and improvement of CTE programs.

While districts and states may mandate specific assessments, accomplished CTE instructors select, modify, and design their own examinations as well. As with all aspects of their teaching practice, CTE instructors collaborate with internal and external stakeholders to enhance their students' educational experience. Teachers implement a variety of assessment methods based on the attributes of the content being measured and the characteristics of the students taking the measurements. Educators evaluate student learning carefully and consistently to help students gain insight into their skills and abilities in relation to industry guidelines and academic standards. Accomplished teachers utilize measurements to nurture student learning, analyze their teaching practices, and advocate for their programs. Most importantly, CTE instructors use assessments to achieve productive educational outcomes, ensuring that the assessments they administer serve their students well by helping them attain their postsecondary goals.

Standard VI

Postsecondary Readiness

Accomplished teachers facilitate career exploration and promote the acquisition of knowledge and skills so students can make informed career decisions that match their interests and aptitudes with the needs, expectations, and requirements of industry.

Accomplished career and technical education (CTE) teachers prepare their students for opportunities beyond middle and high school by helping them acquire knowledge, skills, and dispositions critical to future success. From the middle through high school levels, teachers support students as they advance from career exploration to work-based learning experiences focused on their professional choices. Educators foster their students' growth and development after graduation by encouraging them to pursue academic courses of study, career-specific accreditation programs, or military service so they can attain degrees, certifications, and licensures. Accomplished CTE instructors help their students identify and take advantage of postsecondary opportunities that best fulfill their personal needs, interests, and aspirations.

Students have a wide range of educational and professional opportunities available to them after high school graduation. Accomplished CTE teachers at both the middle and high school levels help their students explore these options carefully, enabling students to make informed decisions while formulating their postsecondary plans. Teachers have their students complete career interest inventories and review the results with them so students can match their interests and aptitudes with potential professions. CTE instructors also coordinate activities such as college visits, career fairs, and workplace field trips so students can learn more about the types of work done at various business organizations and educational institutions. Instructors inform their students about industry specifications, having them research professions to compile information about hiring outlooks, salary ranges, educational backgrounds needed, and other key factors related to career fields. Importantly, teachers expand their students' investigations of career requirements and rewards by providing them with the benefits of real-world experience. They urge students to seek work-based learning opportunities through internships, job shadowing, apprenticeships, and other experiences supported in partnership with local colleges, universities, and businesses, all to help students discover as much as possible about the postsecondary opportunities they could pursue.

Accomplished CTE instructors ensure that their programs are structured to support students in the formation and achievement of their goals. Teachers know

that postsecondary readiness begins in elementary school and continues through high school, so they collaborate with stakeholders to coordinate educational planning across grade levels. For example, a CTE middle school instructor may work with elementary teachers to promote students' technological literacy by setting up peer tutoring programs; meanwhile, another CTE middle school teacher might analyze assessment data to design and coordinate transition programs with high school teachers; finally, one CTE high school teacher might contact local businesses to identify workplace readiness skills and confirm that the curricular goals of his program align with industry needs, while another high school teacher might meet with staff at a postsecondary institution to help establish an articulation agreement. Accomplished teachers at all grade levels reinforce the vertical alignment of curricula to make sure their students have the means of transforming postsecondary possibilities into realities.

Accomplished CTE teachers know that obtaining information about postsecondary opportunities and conveying that information to students and their families are integral aspects of their jobs as educational professionals. CTE instructors conduct ongoing research to maintain a current understanding of the many paths to postsecondary success. They reflect on their professional experiences, stay abreast of the latest career and educational trends, and forge collaborative partnerships with school and career development counselors as well as representatives from higher education. Teachers review programs of study within their areas of specialty and reacquaint themselves with higher education requirements and certification criteria on a regular basis so they can assist students with individualized course scheduling, help them earn college credits, and show them how to pursue professional credentials. Teachers also find out about scholarships and other financial support that will help students gain access to higher education. They share all this information with students and encourage them to research postsecondary programs further based on their individual academic and career preparation needs instead of a generic ranking of institutions. Teachers urge their students to investigate factors such as acceptance, retention, and job placement rates so students can make knowledgeable choices about educational institutions. CTE instructors understand that parents are vital stakeholders in this process as well, as they are in all aspects of their children's educations, so instructors work with parents to acquaint them with postsecondary alternatives that may benefit their children. CTE teachers facilitate their students' postsecondary planning in multiple ways.

By informing students about available resources and nurturing their sense of self-efficacy, accomplished CTE instructors help them make the best possible use of the tools available to them. Teachers provide their students with the chance to develop self-awareness and personal confidence based on their unique skills, abilities, and talents. For example, a CTE teacher may invite students to participate in career and technical student organizations or conduct service projects so students can explore their interests and build employability skills. Instructors ask students to reflect on their experience in order to articulate their ambitions, establish personal goals, and design their own plans for achieving future success. CTE teachers mentor their students to help them face the challenges and earn the rewards awaiting them in the postsecondary world. For instance, an educator may not only inform students about

financial aid options, but also assist them with applications so students can learn how to obtain the resources they need to realize their dreams. Similarly, another instructor may review his students' professional portfolios so they can understand how to make themselves more attractive to potential employers. Accomplished teachers support their students by encouraging them to take ownership of their postsecondary planning and inspiring them to become autonomous decision makers.

Accomplished CTE teachers are invested in improving the employability of their students, whether they seek work-based learning opportunities during high school, pursue employment immediately after graduation, or plan to enter the job market during or after a postsecondary program. Teachers help students attain the skills they need for employment during and after high school or college. In all instances, they know that industry professionals expect applicants to be college and career ready—to possess content-related skills like literacy and numeracy as well as employability skills such as creativity and critical thinking. CTE instructors help their students develop a comprehensive knowledge base that includes industry-specific and cross-disciplinary skills, as well as transferable ones. (See [Standard III—Knowledge of Content](#).)

To ensure their students remain as competitive as possible in a fast-paced global marketplace, accomplished CTE teachers foster the growth of positive and productive attitudes toward working in diverse settings, collaborating with others, communicating clearly, remaining flexible, dealing with pressure, learning from criticism, and maintaining a strong work ethic. Instructors emphasize the importance of having students become agile professionals and entrepreneurs, capable of marketing their skills based on the changing needs of industry. Teachers have their students practice strategies and techniques that will help them function efficiently and effectively in the workplace, such as scheduling, organization, and multitasking, as well as time and stress management. CTE teachers also familiarize their students with workplace etiquette. They show students the importance of professional conduct, maintaining personal grooming and appropriate dress, observing attendance rules, and meeting workplace requirements related to labor and industry regulations. CTE teachers underscore the importance of behaving in a professionally ethical manner characterized by the demonstration of honesty, loyalty, integrity, accountability, and respect. Notably, accomplished teachers stress the significance of all these qualities and characteristics in context, as students practice their technical skills in work-based projects. Teachers establish a culture of teamwork, evaluating the effectiveness of group interactions and the quality of group dynamics with the aim of ensuring that students work cooperatively and productively. For example, a floral design instructor may have students create arrangements for a mock wedding and assume different roles for the ceremony; after the event, students might use team rubrics to evaluate every student's contribution during the project, focusing on the demonstration of employability skills. Providing students with real-world projects helps them synthesize the workplace readiness skills they need to become employable and competitive within industry.

Accomplished CTE teachers promote the employability of their students with an eye toward their overall well-being. While they advise students during the employment process as they write resumes and cover letters, acquire recommendations, and interview for jobs, teachers also speak with students about the larger challenges of assuming adult roles. They engage students in conversations about making positive life choices, balancing personal and professional obligations, resolving conflicts, and gaining financial literacy. Educators also help students revisit their career goals based on their developing interests to ensure that students position themselves for success within their professional careers and personal lives. In all aspects of postsecondary preparation, accomplished CTE teachers commit themselves to addressing the “whole student,” to providing students with the knowledge, skills, and ability they need to thrive throughout their lives.

Standard VII

Program Design and Management

Accomplished teachers design and promote quality programs aligned with industry demands. They manage materials and resources to enrich their programs and sustain meaningful educational experiences for their students.

Accomplished career and technical education (CTE) teachers are leaders who take an active role in the design and management of their programs. They vary their approach based on the unique qualities and characteristics of their CTE programs, similar to the way they differentiate their instruction based on the needs and interests of their students. Importantly, accomplished CTE teachers function as program managers regardless of their grade level, regional location, student demographic, or professional area of expertise. No matter the school setting, all CTE teachers engage in some form of data analysis, curricular design, and program advocacy. They seek opportunities to become involved in course and program design or curricular mapping at the school, district, state, or national level, working through professional associations, career and technical student organizations, or other educational networks to sustain the efficacy of their programs and promote the educational goals of their students.

Program Design

Accomplished CTE teachers ensure they are integrally involved in the development and improvement of their programs. The design process in which they participate is a multifaceted operation. Teachers begin by assessing stakeholder needs to validate the creation and refinement of their programs. They speak with school administrators and advisory committees while evaluating their districts' educational missions and standards; they collaborate with representatives from postsecondary institutions while reviewing cooperative alliances and dual credit or articulation agreements; they confer with community and business leaders while reviewing labor demand and supply data that affect the local job market; and they consult parents and students while considering their students' postsecondary needs and interests. Accomplished teachers use stakeholder findings to determine how a program should be designed or modified to achieve educational outcomes and provide technical training currently in demand; during this stage, they may also determine, along with other educators, that a program is no longer viable. For those programs still active, teachers proceed by employing backward design to specify data assessment methods, which leads them to curricular mapping and material and resource selection for the newly designed or reconceived program. Sometimes, during this process, CTE instructors

may experience challenges, such as concerns about program funding, student interest, or lack of administrative support. At these times, accomplished teachers persevere by adopting constructive strategies to overcome challenges. For instance, they may secure grant funds to cover budgeting shortfalls, initiate recruitment plans to generate student participation, or facilitate meetings with community and business partners and school officials to establish arrangements that are beneficial for all parties. CTE teachers work collaboratively and cooperatively to implement solutions that will support the livelihood of their programs.

To safeguard the continuation of CTE programs, accomplished teachers develop or contribute to strategic plans that sustain program quality through targeted curricular modifications. For instance, an educator might use a new instructional resource, or a school district might adopt a new textbook, to ensure that teaching objectives remain current and relevant. Technology that supports instruction, or constitutes a topic of instruction in itself, is constantly evolving; accomplished CTE teachers evaluate these changes in an ongoing manner, determine how they may best use new technology in the learning environment, and employ systematic methods for assessing the value of the technology. For example, before purchasing virtual business software for a marketing program, an instructor might run a pilot test of various software packages for a semester to evaluate their usability and effectiveness first. Accomplished teachers research their options fully to ensure that any changes they make to their programs are well chosen.

Deeply invested in the success of their programs, accomplished CTE teachers are proactive, creating evaluation plans that generate the type of robust data needed to identify changes that will improve curricular design. Effective plans use multiple methods of investigation to measure a range of stakeholder expectations and outcomes that can shed light on unique aspects of program performance. For example, one CTE teacher involved in a program evaluation might interview former students to assess potential areas of curricular strength or weakness; another teacher might survey employers to determine whether the interns from her program are demonstrating effective workplace readiness skills; and a third teacher might study student performance on end-of-course exams to conduct a gap analysis and identify potential deficiencies in curricula. Evaluation plans characterize and compare stakeholder expectations and outcomes, making it possible to analyze factors that affect the satisfaction of local, state, and federal standards and the successful achievement of learning goals.

Program Management

Accomplished CTE teachers contribute to the ongoing management of their programs in various ways. They monitor and maintain student data related to enrollment, placement, retention, and certification to demonstrate successful program outcomes. They inventory and maintain resources such as classroom equipment, materials, or financial funds to protect program investments. Instructors also facilitate cocurricular CTE-related student organizations to motivate students and extend the impact of CTE learning environments. Finally, teachers evaluate the vertical

alignment between middle and high school programs and between secondary and postsecondary programs to preserve articulation agreements held by their schools vis-à-vis dual enrollment, dual credit, or postsecondary credit. So, for instance, an instructor who teaches law and public safety might invite a professor from a local criminal justice program onto her advisory board to promote curricular alignment, to provide her students with the chance to matriculate seamlessly into a postsecondary course of study, and possibly even to champion an opportunity for students to earn college credits. The vigilant management of CTE learning environments ensures that programs remain productive and useful for students.

The information that accomplished CTE teachers gather and examine during management activities supports their advocacy for students and programs. Instructors collect data to demonstrate how CTE programs help schools and districts fulfill their educational goals. For example, a teacher might use pre- and post-testing to identify how the applied mathematical and technical reading components of his program contribute to district objectives for improving numeracy and literacy. Similarly, a teacher might measure program outputs—the number of students who completed the sequence of courses in her program, the number who pursued postsecondary education, or the number who obtained employment in their field—to demonstrate the educational value of her program. Coupled with evidence collected through student and employer surveys or interviews, this information could be disseminated to administrators and school board members or as part of the program’s marketing materials for potential students and their parents. Accomplished teachers use data strategically to promote their programs and gain stakeholder support.

By forming collaborative relationships and building professional networks, accomplished CTE teachers develop sustainability plans that enrich their programs. They seek supplemental funding from private or public sources at the local, state, or federal level so they can subsidize CTE classes and expand course offerings when possible. Teachers also form active alliances with companies and businesses to increase their programs’ appeal and invite the participation of students, parents, and community members. For example, a family and consumer science instructor who teaches apparel production may partner with a local theatre to have her students assist with costume construction so they can gain hands-on experience while the program enjoys beneficial exposure. Instructors market their classes to students so they can raise program awareness and promote broader participation in CTE programs. They may also increase student diversity and address equity issues by recruiting students who have traditionally been underrepresented in specific career pathways. Accomplished CTE teachers integrate program management and advocacy to develop multivalent strategies that make their programs more expansive and rewarding for all stakeholders.

Because career and technical education serves many interests, effective program design is critical. Programs must be aligned with postsecondary educational requirements and workplace demands so students can make informed decisions and prepare themselves for future challenges. Communicating the value of CTE programs to stakeholders across educational and professional communities

promotes widespread understanding of the many ways career and technical education prepares students for successful lives. By demonstrating how applied instruction enhances cross-disciplinary knowledge, builds technical understanding, and develops employability skills, teachers show themselves, their colleagues, and the education profession at large what a significant contribution CTE makes to student learning. Information on the number of students who enter postsecondary education programs and gain employment in various industries reinforces just how profound the impact of that contribution is. Effective program design supports the development of productive programs, while strategic program management ensures that CTE learning environments foster student success for years to come.

Standard VIII

Partnerships and Collaborations

Accomplished teachers collaborate with family, education, industry, and community partners to create challenging real world opportunities and support networks that help students plan, develop, and achieve their career goals.

Accomplished career and technical education (CTE) teachers work collaboratively with family, education, and business partners to develop meaningful opportunities for student growth based on students' individual needs. Early exposure to a variety of careers allows CTE students to select training and coursework that best suits their personal and professional goals. CTE programs provide students with work-based experiences in various professions through classroom projects, internship positions, job shadowing, and career-related activities sponsored by student organizations and guided by industry professionals. Accomplished CTE teachers are invested in engaging stakeholders within the learning environment and throughout the community in their students' educations, to help students plan, develop, and achieve their career goals. Meaningful collaboration with family, education, and business partners provide employers with a highly skilled workforce and help students become productive members of society.

Collaborating with Family Partners

Accomplished CTE teachers know that family members can become their strongest allies in the education of adolescents and young adults. Teachers value the central and distinctive role that families play in the lives of students and strive to form strong partnerships with them by communicating routinely with families. Instructors welcome family members into the CTE learning environment, encouraging them to participate in activities and contribute to the education of their children. Accomplished teachers understand that family partners can offer insightful stories and firsthand knowledge that lend fresh perspective to discussions about students' career opportunities while enriching the learning environment. Teachers foster this type of input on all occasions, clearly signaling through word and deed that families and educators share a mutual interest in seeing students succeed and thus should work together to prepare young people for the future.

Welcoming Families to the Learning Environment

To build positive relationships and establish productive rapport, accomplished CTE teachers initiate regular interaction with families. They convey respect for family

partners and nurture a high level of trust, speaking and listening with equal care so they can relay and receive information that is meaningful to all parties. For example, a CTE teacher might cofacilitate a college night in which students, counselors, and partners from higher educational institutions gather to discuss postsecondary opportunities and admission requirements so students and their families can understand the many options available. Teachers describe students' successes and accomplishments as well as areas requiring improvement for the achievement of future goals. Instructors establish high expectations and provide supportive guidance when discussing students' professional interests and explaining assessment data related to students' college and career readiness skills. At the middle school level, they converse with students and parents about career exploration based on student interests and aptitudes so they can help students select future coursework. For example, a middle school CTE teacher and her students may invite parents and community members to a career and technology student organization (CTSO) exhibition that showcases how CTSO competitions relate to and support career pathways. At the high school level, teachers continue this dialogue by informing students and families about specific postsecondary educational training that would help students achieve their identified college and career goals. Accomplished teachers maintain open lines of communication with parents and caregivers throughout their children's education, encouraging family members to share details about experiences and events that might affect student performance. These exchanges help accomplished teachers learn the expectations and aspirations that families have for their children while suggesting ways teachers might tailor curricula and instruction to address their students' personal influences and needs.

When they communicate with families, accomplished CTE teachers invite parental support for, and involvement in, their children's education by making sure parents and guardians understand the many ways they can participate in learning activities. Instructors inform families about schoolwide and CTE-specific events and work to reduce any barriers to their involvement. Invested in the importance of dialogues with families, teachers use multiple modes of communication to reach families based on their technological resources, cultural backgrounds, and socioeconomic conditions. Teachers encourage parents to take part in classroom discussions and simulations as well as community events sponsored by CTE programs and career-related student organizations so parents can witness learning environments in action. They also invite parents to attend career days and observe job shadowing at the workplace so parents can learn about professional activities geared toward building postsecondary readiness. Finally, they urge parents to serve on CTE advisory boards and other school committees so parents can contribute to curriculum planning and program management. Through these avenues, accomplished CTE teachers help parents acquire greater knowledge about classroom expectations, program goals, industry trends, and postsecondary demands.

Extending Student Support Networks

As appropriate and when possible, teachers engage support providers in conversations with families and students, discussing instructional activities with all parties to ensure that students receive the full benefit of the relationship among

school, family, and support provider. For example, a CTE instructor may include a vocational rehabilitation case manager in a student-led conference about the status of her skill development in a course. In this meeting, the student could advocate for herself and work with a team of providers to select a career training program after graduation. Working in conjunction with school counselors, teachers help families understand what CTE programs have to offer their children and how students can make the best use of postsecondary opportunities.

Accomplished CTE teachers seek common ground to build an understanding with families that best serves student interests. Instructors understand that, despite their best efforts, relationships with families may not always be congenial or effective; yet, they strive to appreciate family points of view in these instances and remain dedicated to advancing their students' learning experience. For example, a teacher may advocate for a student with disabilities who requires long-term medical care by engaging his concerned parents in a series of conversations, all in the hope of convincing them that their child should continue pursuing his dreams without delay by working with the teacher in the family home. Likewise, an instructor with a student who has career interests with which her parents differ may broker family support by explaining how talented and passionate their child is and how lucrative job prospects could be for someone skilled in this career area. Throughout discussions like these, CTE instructors project a positive and respectful demeanor with family members. Knowing that students need effective support systems to achieve their college and career goals, teachers develop productive working relationships with families and support providers to help students negotiate family, school, and social demands.

Collaborating with Education and Business Partners

By building substantial networks with education and business partners, accomplished teachers sustain the educational goals of CTE programs and secure a wide range of postsecondary opportunities for their students. Instructors pride themselves on their ability to make the best possible connections for their students based on local resources and industry demands. At the middle school level, these connections may be forged primarily with colleagues at the high school level and focus on strengthening vertical alignment. High school teachers expand collaborative relationships with instructors at institutions of higher education as well as professional colleagues and business and corporate representatives. Partnerships like these are integral to CTE program design and implementation because they ensure that curricula remain well aligned with the demands of postsecondary education and closely tied with the realities of the workplace. Education and business partners help CTE teachers connect theory with practice so their students can achieve future goals as efficiently and effectively as possible.

Strengthening Curricula

Accomplished CTE teachers collaborate with instructors in all departments, at all educational levels, to strengthen their curricula. Teachers promote the vertical alignment of technical skills and cross-disciplinary knowledge between grades as well as horizontal alignment within grades. They know that wide gulfs often separate them

from teachers in general education programs. In these instances, CTE instructors build bridges to their colleagues, removing barriers to professional interaction whenever and wherever possible for the benefit of all students. Conferring with educators within their schools and districts, CTE middle and high school teachers ensure that course objectives support the logical progression of students' career and technical skill sets as they advance to graduation. (See [Standard VI—Postsecondary Readiness](#).) CTE teachers also meet with instructors in general education departments to sponsor and sustain cross-curricular activities that encourage the development of students' interdisciplinary knowledge at each grade level. In units they teach with other educators and in courses they lead on their own, CTE teachers embed the instruction of cross-disciplinary skills within work-based projects. For example, a sewing instructor may team with social studies and mathematics instructors to present a unit on political activism in which students integrate historical theories with geometric principles and technical skills to select textiles, design patterns, and produce quilts that support a perspective or cause. Using applied contexts to clarify learning concepts and reinforce their significance, CTE teachers help students build their interdisciplinary knowledge and improve their academic achievement in all classes.

Accomplished CTE teachers help their students achieve smooth transitions to postsecondary education. They do so at the high school level by securing articulation agreements with postsecondary programs and institutions, promoting dual enrollment and early college admission, and advocating certification training. CTE instructors develop partnerships with postsecondary faculty and staff to ensure that curricular objectives meet postsecondary requirements and that CTE program goals are thus closely aligned with the demands of higher education. For instance, a teacher may serve on a committee with higher education officials to review entrance qualifications and standardized assessments for various programs of study. CTE instructors inform their students about postsecondary educational opportunities and encourage students to make good use of them. They raise student awareness in many ways, for instance, by hosting or attending career fairs, organizing campus visits, inviting guest speakers, or attending competitions designed to showcase various opportunities in career and technical education. Accomplished teachers know that the creation of seamless curricula from secondary to postsecondary institutions requires the careful sequencing of CTE coursework. Furthermore, they understand that this continuity is critical for students because it positions them for postsecondary success and shows them the rewards of becoming lifelong learners.

Facilitating Career Exploration and Developing Employment Opportunities

Accomplished CTE teachers network with business partners by maintaining active memberships in professional and technical organizations or by participating in advisory committees, local chambers of commerce, or other civic groups. They attend meetings and other functions, understanding that this type of interaction can help them gain human and financial resources critical to the success of their programs and their students' careers, such as on-the-job training and other avenues for career exploration. Corporate partners and policy makers also share timely information with CTE instructors about industry standards and economic fluctuations affecting the job market. This information helps teachers maintain strong connections between

CTE course objectives and real-world demands, which enables them to advocate for their programs and leverage their resources. For example, a welding instructor may attend a conference to stay abreast of the industry forecast within her state; after learning about opportunities related to underwater welding, she could share these findings with her colleagues, collaborate with them to attain funding, and purchase the equipment needed to offer instruction in this field. The business alliances that CTE teachers form thus promote the viability of their programs on multiple fronts, all of which are geared toward improving student outcomes in relation to workplace preparation and hiring prospects.

While partnerships may vary based on the trends and demands of local industries, accomplished CTE instructors seek multifaceted alliances to attain a range of real-world experiences for their students, including apprenticeships, internships, and job shadowing as available. Active immersion in work settings allows students to confront professional issues, address problems, and put solutions into practice, leading to the type of reflection that empowers career planning. The chance to experience workplace demands and dynamics firsthand provides CTE students with excellent preparation for future employment. For example, a family and consumer science instructor who teaches culinary arts might facilitate an internship at a local bakery so a student interested in becoming a pastry chef could learn the daily challenges of this job. Based on what they know about students before, during, and after work-based learning experiences, CTE teachers understand the efficacy of using these opportunities to guide career exploration and job placement. They gain information about the value of these experiences in various ways, for instance, by speaking with job supervisors, examining student portfolios, or evaluating surveys submitted by students and their employers. CTE teachers highlight their students' success in the community to demonstrate their strengths and skills and show the value that work-based learning experiences hold for all participants, students and employers alike. Teachers know that creating this type of awareness in the business community will attract opportunities for other students in turn and advertise the contributions that CTE students as a whole can make to the workforce.

Extending CTE Programs into Communities

Meaningful interaction with family, education, and business partners expands the boundaries of the CTE learning environment. Accomplished teachers are dedicated to providing their students with useful, practical experiences by extending CTE programs into communities where people live and work. Instructors thus do more than prepare students for the challenges of postsecondary education and employment—they encourage students to become active members of their cities and towns.

For many students, participation in local clubs, community groups, and volunteer or service organizations may already be an important part of their lives. Accomplished CTE teachers build on these experiences to nurture their students' social engagement and strengthen their commitment to the concept of community. Educators emphasize the rewards associated with civic involvement, showing students how their contributions can help them achieve postsecondary goals while improving their communities. Through CTE-sponsored participation in community

activities and events, students assume responsibility, take action, and exercise leadership as they cultivate transferable skills. For instance, an industrial technology teacher may organize a project so students can work with a local contractor to build homes for people in need. Similarly, students in a business marketing course may band together to design posters advertising a local charity event. Whether working as individuals with education and business partners or as members of a career-related student organization, students develop a vital sense of initiative. They experience personal and professional growth and help form a future workforce responsive to industry and community needs.

The contributions that students make to their communities benefit all participants and thus develop support for CTE programs among family, education, and business partners. Accomplished CTE teachers empower their students to assume leadership roles and raise awareness of their programs. For example, members of student organizations may represent their programs by delivering presentations at local rotary clubs, chambers of commerce, or career fairs. Accomplished CTE instructors marshal the advantages of applied instruction showcased in these and other venues to promote their programs and advocate for resources among parents, alumni, community members, and elected officials. Teachers share the tangible rewards of career and technical education to increase the network of individuals interested in advancing the goals of CTE programs and the success of CTE students.

Standard IX

Leadership in the Profession

Accomplished teachers collaborate with stakeholders within their schools and communities to improve instruction, promote student learning, and advocate for their fields of expertise in education and related industries.

Accomplished CTE teachers are effective teacher leaders who understand their roles as contributors to and advocates for career and technical education. They recognize there is a continuum between the roles of learner and leader, and they act as both to leverage the strength of others and maximize outcomes that empower the profession. Working to improve student learning and promote the growth of CTE programs, they provide significant leadership at a variety of levels—local, state, or national. Accomplished teachers work tirelessly, securing and safeguarding program resources, developing curricula, engaging in professional development, mentoring other educators, and advocating for the profession.

Without ample resources, CTE programs cannot flourish. In the absence of school or system level funding, accomplished instructors actively pursue business partnerships to obtain access to equipment, materials, and supplies they need to sustain the innovative curricula that characterize continuously evolving CTE learning environments. Teachers petition stakeholders to fund the design and implementation of educational experiences that inspire intellectual discovery. For instance, a culinary arts instructor may convince local restaurateurs to sponsor small-scale student enterprises, culminating in the operation and management of a class catering venture. In addition to community-based partnerships, teachers might individually or jointly apply for corporate and educational grants to fund creative projects. For example, a team of teachers specializing in engineering, apparel design, and the performing arts might obtain a grant so their students can observe theatre professionals at work, engage them in a dialogue about their craft, and put lessons learned into practice by designing sets, creating costumes, and staging their own play for the public. Endeavors like these support CTE teaching objectives while drawing attention to the unique value that CTE programs bring their students, namely, the opportunity to plan complex projects and turn them into reality using a wide range of skills to meet challenges and solve problems along the way, as professionals do in the workplace.

Procuring resources to maintain and advance CTE programs represents one aspect of teacher leadership; sharing resources with other educators through the development of curricula is another. Accomplished CTE teachers value their relationships with educators in career and technical education and in other disciplines.

Forging connections with their colleagues, they combine resources to create learning environments that help students build cross-disciplinary knowledge and connect instructional content with real-world experiences. For example, a health teacher may collaborate with science and mathematics instructors to identify related objectives in their curricula and develop cross-disciplinary units on the analysis of nutritional content in packaged foods. Or a construction technology teacher may work with a mathematics instructor to sponsor a joint project that requires students to master geometric principles while designing and building playground equipment for a local school. In both instances, CTE instructors devise curricula that not only stress the importance of developing cross-disciplinary knowledge, but also demonstrate the pedagogical advantage of synthesizing it through application in a professional context.

To create and enhance curricula, accomplished CTE teachers collaborate with educators and professionals in their technical fields on the state or national level as well. Often, these opportunities arise through membership in professional associations. For example, an aviation instructor might collaborate with a team of teachers affiliated with his career and technical student organization on the state level to align content standards with performance criteria used at competitive aviation events. Or a computer programming instructor might work with programmers across the country to review the curriculum for an online course being developed as an open educational resource for teachers and students worldwide. While all teachers engage in developing curricula for their classrooms, accomplished teachers collaborate with others so they can offer their students exciting, compelling content that takes multiple viewpoints into consideration. Teaming with colleagues and administrators as well as postsecondary educators, industry partners, and community leaders, accomplished CTE teachers continuously strive to extend and enrich the learning opportunities available to students in their programs.

Curriculum development often triggers discussions about the implementation of new resources. Accomplished CTE teachers take the lead in identifying professional development opportunities and supporting the management processes used to integrate resources. All educators engage in training activities to improve their instructional practices and student outcomes, but accomplished educators select opportunities purposefully, reflecting on student data and their teaching experiences to identify gaps in their professional practice. Instructors encourage their colleagues to participate in these opportunities as well by organizing or promoting learning events at their schools and districts or within larger professional communities. For example, a CTE teacher may choose an educational topic, select an appropriate book, and gather a study group of colleagues in her building; she may also assemble a team through a professional network or organization to provide in-service training on technology newly implemented in her building. CTE instructors understand the vital importance of undertaking regular professional development as a teacher and as a practitioner in a field, and they participate in training with a dual purpose in mind—to strengthen their pedagogical and technical skills so they can improve student learning and promote program growth. CTE instructors work with other faculty and staff diligently, engaging in learning communities, contributing to management and decision-making processes in their programs, and implementing plans for continuous

school improvement. Accomplished teachers participate in needs assessment activities on district, state, and national levels. For instance, a teacher may submit a professional development survey administered by faculty at a state workforce education program or participate in a delphi study identifying best practices. Accomplished CTE teachers work to advance teaching practices across learning communities and are active members of professional and industry organizations. A teacher may, for example, serve as an officer for a state CTE organization or present a seminar at a national technical conference. Program leadership and professional development go hand in hand for accomplished CTE teachers, who are dedicated to modeling the personal and communal benefits of lifelong learning for their colleagues and students.

In addition to facilitating large group learning, accomplished CTE teachers interact with other instructors as individuals, serving as coaches to support their colleagues' professional development or recruiting teachers to join their programs. CTE instructors act as mentors to help improve the effectiveness of new teachers, with the goal of enhancing student learning and increasing achievement. For example, a team of instructors may share their insights on lesson plans, instructional strategies, classroom management, or data analysis with novice educators. Accomplished CTE teachers may serve as mentors whether they are in the same content area as new instructors or in a different one; similarly, they may advise instructors who are members of non-CTE departments. Within their programs, CTE teachers encourage novice educators to undertake some of the logistical tasks associated with project-based instruction so they can gain more experience while relieving their advisors of some instructional responsibilities. For instance, an engineering teacher who has hosted a robotics competition for years might mentor a new instructor by training him to host the competition on a biannual basis to the benefit of both teachers. Experienced educators work proactively with novice teachers to maintain a high quality of instruction in CTE programs and to promote the efficiency of their management. Reaching out beyond their programs, instructors also recruit and advise individuals interested in pursuing teaching as a career. For example, a CTE instructor may speak at local colleges, universities, or trade organizations to inform future educators about career opportunities in CTE programs—or may welcome interns to the classroom to demonstrate the challenges and rewards of being a CTE teacher. Mentoring teaching candidates and novice teachers supports the recruitment and retention of CTE professionals and strengthens the delivery of instruction in engaging learning environments.

To meet student needs and improve outcomes, accomplished CTE teachers support other teachers while advancing their programs and advocating for career and technical education as a whole. They understand the importance of promoting CTE programs to students, parents, educators, and employers so every stakeholder understands the value of CTE and the significant role it plays in preparing tomorrow's graduates for the workplace. Accomplished teachers communicate this message by engaging in conversations, making presentations, writing editorials, and pursuing other activities that convey the positive impact of career and technical education. They may contact local and state representatives and initiate dialogues with policy makers that stress the urgency of securing resources and funds for the continuation

and expansion of CTE programs. Teachers also develop relationships with other members of their state and national professional organizations to expand the number of partners in their programs' success. Accomplished teachers may regularly do any and all of these things to convey the mission of CTE to the public. For example, a teacher who develops a seminar about the implementation of current trends in CTE classrooms and the benefits of having well-trained students for local industry may advertise the seminar in trade journals, gain interest from business representatives, and increase the network of stakeholders interested in hiring students and possibly contributing resources, materials, or time to his program. Successful advocacy requires initiative on the part of CTE instructors and involvement on the part of stakeholders. Collaboration fuels advocacy, and advocacy inspires collaboration—the accomplished teacher recognizes this synergy.

Accomplished teachers understand the power of showcasing CTE programs and student organizations to community members, work professionals, and elected officials so that these stakeholders can witness the educational value and economic impact of career and technical education in action—and become involved, or remain involved, in sustaining these vital learning environments. For instance, a family and consumer science teacher who manages a hospitality program might contact the local chamber of commerce to arrange an opportunity for students to cater a legislative open house or charity fundraiser; after observing the students in action, community members might offer the teacher more work proposals or inquire about other ways to support her students and program. Teachers use many ways to present their students' work. Educators may host open houses that feature student projects or sponsor career fairs at which students, parents, and members of the local community can learn about a range of student-led business ventures and find out how to support CTE. Instructors may also write blogs that describe classroom- and community-based activities or use newspaper articles and press releases reporting student service projects and club competitions to reach a larger number of community stakeholders. In all these ways and more, accomplished CTE teachers strive to bring stakeholders into the learning environment so instructors can broaden the audience for their students' work, enrich their experience, and show stakeholders how students in thriving CTE programs learn, grow, become professionals, and contribute to their communities. By demonstrating the wealth of opportunities that CTE programs can offer their students, from the exploration of academic interests to the pursuit of professional success, accomplished teachers illustrate the importance of investing in career and technical education.

CTE programs stop functioning effectively, or cease to exist, if they lack strong support from a diverse network of stakeholders. To prepare their students for postsecondary success, accomplished teachers therefore advocate routinely for career and technical education. They contribute to the education profession continually, motivated by their desire to improve student learning. Teachers work tirelessly to secure critical resources for their programs and to develop exciting curricula for their learning environments. They support their colleagues through mentorship and recruitment activities while engaging in professional development with them. Knowing that those who work in the trenches daily—classroom teachers—are the ones best positioned to impact their profession, CTE instructors

take the initiative and act as leaders while respecting the contributions of others. The professional achievements of accomplished teachers model the benefits of career and technical education for their students: teachers utilize their skills, abilities, and talents to think critically, communicate effectively, collaborate proactively, and solve problems creatively to design new products, envision new opportunities, and meet rewarding goals.

Standard X

Reflective Practice

Accomplished teachers reflect analytically throughout the instructional process, using multifaceted feedback to increase the efficacy of their teaching, strengthen its impact on student development, and model the significance of lifelong learning.

The act of reflection may assume different forms based on the unique characteristics and outlooks of teachers as individuals, but for accomplished career and technical (CTE) instructors it is always characterized by a fundamental reliance on higher order thinking skills. Analysis, evaluation, and synthesis form the cornerstones of reflective thought. Accomplished teachers analyze every aspect of their learning environments, from the students and stakeholders who interact within work spaces to the outcomes they achieve. Instructors evaluate the meaning of words, deeds, and expressions, sensitive to fluctuations in the learning dynamic within their classrooms. They continually synthesize all these elements, considering the significance of interactions between classroom participants so they can understand the crucial relationship between instructional objectives and learning outcomes. Accomplished CTE teachers ask themselves which strategies work well in a given situation, how they might be improved, and when they might prove useful again in the future. They ask these questions in the moment, as they teach and students learn, so they can modify their instructional approach as needed. They ask these questions in retrospect as well, after they have left the classroom, when they develop their thoughts further in quiet contemplation. Accomplished CTE teachers reflect on all aspects of their practice at all times.

The various approaches that accomplished CTE teachers take to reflection share a focus on results-based analysis. CTE instructors evaluate student progress against measurable learning outcomes. They reflect analytically throughout the instructional process, while planning lessons and projects, evaluating the effectiveness of their strategies and techniques, and assessing the nature of student understanding. Reflection takes place before, during, and after working with students in the learning environment, defining every aspect of accomplished teaching and professionalism. It is an ongoing habit of mind, cyclical in nature; inspired by careful observation, reflection influences CTE instructors and affects their practice. Accomplished educators think about the context of teaching as well as the many factors that can influence learning, for instance, by considering how the scope and sequence of a curricular unit, the hour of instruction, or individual personality traits may affect student understanding. Educators contemplate their teaching skills, examining their interactions in the learning environment and studying feedback from stakeholders to hone their instructional

approaches. They understand that reflection is a multifaceted pursuit. Instructors use it to improve student outcomes, strengthen the efficacy of their teaching, and foster lifelong learning. They model the benefits of reflection for other members of the learning environment, from students to colleagues to other educational partners. As a result of their reflective practice, accomplished teachers avoid impulsive decision making and promote careful reasoning. They deliver responsive, insightful instruction that not only inspires their students but also contributes to their development as professionals.

Analyzing Instruction

Accomplished CTE teachers consistently engage in reflection as they design projects and units of study. They analyze various factors that can influence classroom activities, taking into consideration their students' knowledge bases, learning styles, and diverse attributes when deciding how to implement instruction. For instance, to meet the needs of visual, auditory, and kinesthetic learners, a CTE teacher might have students learn about their chosen professions by interviewing industry professionals, conducting research, or participating in job shadowing. The careful analysis of their students' qualities and characteristics helps to inform the content that accomplished educators address on a daily and weekly basis as well as the methods they adopt to scaffold learning. Guided by their students' unique needs and personal experiences, accomplished teachers choose materials and structure activities to cover course objectives in a way that maximizes student engagement while satisfying curricular requirements. For example, a CTE teacher with students from predominantly non-English-speaking communities might obtain trade manuals written at different reading levels so all students can focus on the acquisition of technical skills and knowledge regardless of language proficiency. Similarly, an automotive technology teacher with a student who uses a wheelchair might modify the physical layout of the garage based on universal design principles that promote accessibility to ensure that her student can participate actively with everyone else in the class. Reflection helps teachers formulate their instructional strategies and meet students' individual needs while advancing the learning of all students.

Knowing that the social and emotional development of students directly affects their success in the classroom, accomplished CTE instructors reflect on how they can support their students' growth in these areas. Teachers remain attentive to their students' socioeconomic status as well as their cultural backgrounds, taking their students' personal resources into account as they plan learning activities. For example, a teacher with students who have restricted access to technology may build in class time at her school's media center, provide her students with printed materials, or give her students information about a computer lab they can use at the public library to complete project tasks. Accomplished teachers organize their instructional activities to encourage student participation and avoid obstacles that might impede learning. They promote inclusive and nurturing learning environments, taking action based on their consideration of students' individual needs. For instance, a family and consumer science instructor who teaches apparel design in a Native American community may allow her students to work on traditional dress in lieu of another clothing article so students can construct the garments they need for cultural activities

while completing their class assignment and saving money at home. Sensitivity to their students' cultural values and social conditions allows accomplished teachers to build their students' self-esteem while supporting instructional goals.

The thoughtful reflection that accomplished CTE teachers undertake before entering the learning environment continues during instruction. As they teach, educators judge how well students engage with the material, why certain strategies may work better than others, where more attention or different techniques may be needed, and what must take place during the next session to advance student learning. For example, a lodging and tourism instructor using reservation software to teach her class about booking methods that maximize hotel profits may receive questions from her students that help her realize they are confused; as a result, the teacher may decide to facilitate whole group discussion on the spot to scaffold the lesson. Educators also consider how they may customize instruction to meet unique student needs within their classrooms. For instance, a teacher with gifted students who require enrichment may create challenging activities by having the students conduct peer reviews, work on advanced assignments, or pursue independent study. Teachers continuously identify, analyze, and take advantage of opportunities to optimize student development and growth within the learning environment.

After instruction, CTE teachers continue to analyze the dynamics of the learning environment so they can determine how best to move forward from day to day, term to term, and year to year. For instance, a teacher may take anecdotal notes about a unit of study to assess the effectiveness of instructional strategies for a current group of students and use this information to make decisions about lesson delivery for a future group. Instructors also evaluate their assessment strategies to ensure they acquire meaningful and reliable measures of student growth. For example, a teacher who determines that his unit is effective based on student performance may consider how he can further enhance the unit and improve the measurement of student achievement by incorporating more technology into his instruction. Accomplished instructors continuously reflect on how they can fine-tune their teaching practices to improve student outcomes. (See [Standard V—Assessment](#).)

Accomplished CTE teachers extend their reflection about the learning environment by considering the impact that program management has on the instructional process. Teachers analyze enrollment trends and retention patterns to evaluate student interest and engagement, and they adjust their recruitment strategies as needed, for instance, by recruiting students in programs that are nontraditional for their gender. Instructors gauge the nature of cocurricular activities, some of which may include career and technical student organization competitions and events, so they can assess program efficacy and the availability of postsecondary positions. Educators also consider the ongoing effectiveness of their advisory boards to see if student needs are being met. They develop rubrics with board members to evaluate total program performance and ensure that learning environments are benefiting adequately from stakeholder expertise. Working with board members, teachers collect statistical information related to factors such as cocurricular activity, work-based learning opportunities, and postsecondary placement. Accomplished instructors reflect on the program and

classroom level to provide the resources and support their students need to achieve their occupational goals. (See [Standard IV—Learning Environments and Instructional Practices](#) and [Standard VII—Program Design and Management](#).)

Pursuing Professional Growth

While accomplished CTE teachers reflect productively based on their own observations, they also solicit and welcome feedback from other stakeholders. Instructors know that students, parents, colleagues, and industry partners all have unique perspectives and thus offer different insights on activities in the learning environment. Educators value these viewpoints and use them to improve their teaching methods and to verify that students receive rigorous instruction of relevant content.

Accomplished CTE teachers begin by engaging students and their parents as active partners in the educational process. They use formative and summative assessments such as student surveys, exit slips, journals, and competency exams to determine which teaching practices students find effective and which ones ineffective. They consider the implications of verbal and nonverbal cues, evaluating what students say and write as well as how they react. During instruction, teachers continue evaluating signs such as body language and facial expression to gauge student understanding. To increase the usefulness of this feedback, teachers ask their students timely questions about what affected their comprehension of the subject matter and how they think teachers might improve instruction. CTE instructors speak with families about the learning environment as well, maintaining regular contact and exchanging information through newsletters, surveys, and other means of communication. Teachers honor the knowledge that parents have of their children, converse with them thoughtfully to learn more about students, and react to this feedback by formulating strategic, measured responses in the classroom that meet students' instructional needs and foster their success.

Colleagues, including instructors, administrators, and other members of professional learning communities, contribute significantly to the growth of accomplished CTE teachers. Classroom walkthroughs, evaluation notes, and other forms of collaboration with educational partners can guide teacher reflection and help improve their instructional practice. For example, a JROTC instructor might consult a physical education teacher about physical training to find out how she could improve a lesson plan and strengthen interdisciplinary integration within her program. The teachers in a professional learning community may review and help revise each other's lessons to ensure they align with student needs and learning objectives; these teachers may also reconvene to discuss outcomes and refine future lessons. Accomplished teachers are willing to host and participate in activities such as peer observations and instructional rounds to glean best practices and engage in meaningful feedback that supports a culture of teaching excellence. For accomplished instructors, a network of respected colleagues who meet to have structured conversations about students and their learning can become a powerful catalyst for reflection.

Accomplished CTE teachers work with business professionals as well to sharpen their technical skills and remain current with relevant technologies, standards, and industry trends. For example, a health services teacher who recognizes that changes to a health care system require the implementation of electronic records may speak with a medical office manager to consider how these changes should affect curricular plans and classroom equipment. Accomplished CTE teachers know they must continue developing their technical knowledge as well as their instructional skills to support the future success of their students in the evolving world of work. They analyze their strengths and weaknesses using stakeholder feedback and assessment data to identify areas requiring growth and target opportunities for professional development. Accomplished educators understand that reflection is not a finite process but instead represents an open-ended pursuit of deliberate consideration and dedicated improvement.

Promoting Lifelong Learning

As lifelong learners, accomplished CTE teachers know that reflection helps them address changing educational needs. It takes place continuously, over the course of a day, a unit, a term, and a career. CTE instructors are vigilant about maintaining professional rigor and agility in their approach, examining and strengthening their technical skills and teaching practices to improve student outcomes. They nurture a similar sense of purpose in their students, helping them understand the need to consider new ideas, advance their knowledge, and mature as learners through sustained reflection. Throughout the learning process, CTE teachers convey the importance of continuous improvement and promote the value of lifelong learning.

Accomplished CTE teachers build opportunities for student reflection into their curricular plans through peer activities and intrapersonal exercises. Instructors know that giving students feedback on task performance and analyzing assessment data with them can help students identify their strengths and weaknesses. Students can form a better understanding of their learning styles, realize what works best for them, and reach useful insights about their educational development. Teachers relay this type of feedback in visual, written, or oral formats. For example, a sign language instructor may record students translating a speech so they can analyze their posture, demeanor, hand gestures, and other nonverbal cues and evaluate how well they communicate with their intended audience. Similarly, a video production teacher may observe his students and give them oral feedback to help them resolve problems transitioning between cameras due to misunderstanding of the process or difficulties following teacher prompts. Importantly, teachers provide students with structured feedback and model its evaluation to ensure that students learn how to reflect productively.

Accomplished CTE teachers make good use of any opportunity to reflect purposefully with their students. So, for instance, a team of junior apprentice HVAC students who encounter a hostile customer may speak with their supervising teacher after a service call to consider how changes in their actions and behavior could promote a more cooperative dynamic and optimal outcome in the future. Or

an instructor may use examples of inappropriate or unproductive student behavior, such as verbal insults or an unwillingness to collaborate, as teachable moments to emphasize the significance of a positive outlook or attitude that students may have initially dismissed. CTE instructors help their students understand the far-ranging benefits of reflection to discourage habits that impede their academic progress and to support the advancement of their career goals.

Accomplished CTE teachers embrace a holistic view of reflection. They engage in analysis before, during, and after instruction to advance student knowledge by evaluating the factors that drive student learning. They synthesize the conclusions they draw about their learning environments and instructional practices so they can respond to their students by taking clear, purposeful action. Throughout this process, instructors view student learning through a variety of lenses, taking into consideration the feedback of students, parents, colleagues, and other stakeholders. If the actions that instructors take are not productive at first, they evaluate their situations further, speaking with more people and resuming their deliberations. Whether they think in silence or write in journals, accomplished teachers contemplate what has happened and imagine how it might change. The reflection that educators undertake is inherently rational, yet distinctly intuitive, grounded in a careful examination of their students and in a fervent belief in who they can be and what they can achieve. The dual nature of these reflections empowers teachers as professionals, enabling them to design cogent, compelling instructional strategies that nurture their students' continued growth and development.

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The National Board is deeply grateful to all those who contributed their time, wisdom, and professional vision to *Career and Technical Education Standards, Second Edition*. Any field grows, shifts, and evolves over time. Standards, too, must remain dynamic and therefore are subject to revision. In 2013, the National Board convened a second Career and Technical Education Standards Committee. This committee was charged with achieving both continuity and change, using the previous edition of the standards as the foundation for its work but modifying the standards to reflect the advances of the early twenty-first century. The Career and Technical Education Standards Committee exemplified the collegiality, expertise, and dedication to the improvement of student learning that are hallmarks of accomplished teachers. Special thanks go to committee co-chairs John Cannon and Indira Cureton-Cummings, NBCT, for their invaluable leadership in making the second edition a reality.

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