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ABSTRACT

This document examines the 12 draft standards for accomplished vocational education teachers that were developed by the National Board for Professional Teaching Standards, a nonprofit, nonpartisan organization that was founded in 1987 to strengthen the teaching profession and thereby improve learning. The 12 standards pertain to the following objectives/aspects of vocational education: knowledge of students; knowledge of subject matter; learning environment; advancing knowledge of vocational subject matter; workplace readiness; managing and balancing multiple life roles; social development; assessment; reflective practice; collaborative partnerships; contributions to the professional community; and family and community partnerships. The preface and introduction discuss the following: the philosophical context, role of the standards in the certificaton framework, and the importance of standards as a tool for strengthening teaching and thereby preparing adolescents to meet the changing demands of the workplace. After a brief overview, each standard is discussed in detail along with the knowledge, skills, dispositions, and habits of mind that allow vocational educators to practice at a high level. Concluding the document are an epilogue, list of standards committee members, and feedback form. (MN)

Vocational Education

DRAFT

Standards
for
National Board Certification

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National Board
FOR PROFESSIONAL
TEACHING STANDARDS

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Table of Contents

Preface

The world-class schools America requires cannot exist without a world-class teaching force; the two go hand in hand. Many excellent teachers already work in the nation's schools, but their work is often unrewarded and underappreciated, their knowledge and skills unacknowledged and underutilized. Delineating outstanding practice and recognizing those who achieve it are important first steps in shaping the kind of teaching profession America needs. This is the core challenge embraced by the National Board for Professional Teaching Standards (NBPTS). Founded in 1987 with a broad base of support from governors, teacher union and school board leaders, administrators, college and university officials, business executives, foundations and concerned citizens, NBPTS is a nonprofit, nonpartisan organization governed by a 63-member Board of Directors, the majority of whom are teachers. Committed to basic reform in American education, the National Board recognizes that teaching is at the heart of education and, further, that the single most important action the nation can take to improve schools is to strengthen teaching. To this end, the National Board has embarked on a three-part mission:

- to establish high and rigorous standards for what accomplished teachers should know and be able to do;
- to develop and operate a national voluntary system to assess and certify teachers who meet these standards; and
- to advance related education reforms for the purpose of improving student learning in American schools.

Achieving this mission will elevate the teaching profession, educate the public about the demands and complexity of excellent practice, and increase our chances of attracting and retaining in the profession talented college graduates with many other promising career options.

National Board Certification is more than a system for recognizing and rewarding accomplished teachers, however. It represents both an opportunity to rethink the way the profession organizes itself for the continuing growth and development of its members, and a chance to design new ways to organize and manage schools to capitalize on the expertise of accomplished teachers. Together with other reforms, it can be a catalyst for significant change in the profession and in American education.

The Philosophical Context

The standards presented here lay the foundation for the Vocational Education certificate. They represent a professional consensus on the critical aspects of practice that distinguish exemplary teachers in this field from novice or journeymen teachers. Cast in terms of actions that teachers take to advance student outcomes, these standards also incorporate the essential knowledge, skills, dispositions and commitments that allow teachers to practice at a high level. Like all National Board standards, they rest on a fundamental philosophical foundation, expressed in the NBPTS policy statement *What Teachers Should Know and Be Able To Do*. That statement identifies five core propositions:

1) Teachers are committed to students and their learning.

National Board Certified Teachers are dedicated to making knowledge accessible to all students. They act on the belief that all students can learn. They treat students equitably, recognizing the individual differences that distinguish their students one from the other and taking account of these differences in their practice. They adjust their practice, as appropriate, based on observation and knowledge of their students' interests, abilities, skills, knowledge, family circumstances and peer relationships.

Accomplished teachers understand how students develop and learn. They incorporate the prevailing theories of cognition and intelligence in their practice. They are aware of the influence of context and culture on behavior. They develop students' cognitive capacity and their respect for learning. Equally important, they foster students' self-esteem, motivation, character, civic responsibility and their respect for individual, cultural, religious and racial differences.

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

National Board Certified 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 faithfully representing the collective wisdom of our culture and upholding the value of disciplinary knowledge, they also develop the critical and analytical capacities of their students.

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 of strategies and instructional materials that can be of assistance. They understand where difficulties are likely to arise and modify their practice accordingly. Their instructional repertoire allows them to create multiple paths to the subjects they teach, and they are adept at teaching students how to pose and solve their own problems.

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

National Board Certified Teachers create, enrich, maintain, and alter instructional settings to capture and sustain the interest of their students and to make the most effective use of time. They are also adept at engaging students and adults to assist their teaching and at enlisting their colleagues' knowledge and expertise to complement their own.

Accomplished teachers command a range of generic instructional techniques, know when each is appropriate, and can implement them as needed.

They are as aware of ineffectual or damaging practice as they are devoted to elegant practice.

They know how to engage groups of students to ensure a disciplined learning environment, and how to organize instruction to allow 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 to learn and how to maintain their interest even in the face of temporary failure.

National Board Certified Teachers can assess the progress of individual students as well as that of the class as a whole. They employ multiple methods for measuring student growth and understanding and can clearly explain student performance to parents.

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

National Board Certified Teachers are models of educated persons, exemplifying the virtues they seek to inspire in students — curiosity, tolerance, 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 the literature, but also in their experience. They engage in lifelong learning, which they seek to encourage in their students.

Striving to strengthen their teaching, National Board Certified Teachers 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.

National Board Certified Teachers contribute to the effectiveness of the school by working collaboratively with other professionals on instructional policy, curriculum development and staff development. They can evaluate school progress and the allocation of school resources in light of their understanding of state and local educational objectives. They are knowledgeable about specialized school and community resources that can be engaged for their students' benefit, and are skilled at employing such resources as needed.

Accomplished teachers find ways to work collaboratively and creatively with parents, engaging them productively in the work of the school.

The Certification Framework

Using these five core principles as a springboard, NBPTS will set standards and award certificates in more than 30 fields. Most of these fields are defined by two dimensions: the developmental level of the students and the subject or subjects being taught. The first dimension embraces four overlapping student development levels:

- Early Childhood, ages 3-8
- Middle Childhood, ages 7-12
- Early Adolescence, ages 11-15
- Adolescence and Young Adulthood, ages 14-18+.

The second dimension highlights the substantive focus of a teacher's practice, allowing most teachers to select either a subject-specific or a generalist certificate. At the Early Adolescence level, for example, teachers will be able to pursue either a generalist certificate or a certificate in English language arts, mathematics, science or social studies-history. Teachers seeking certification at the Middle Childhood level will have a similar choice. The framework of certificates will also include a generalist certificate at the Early Childhood level and subject-specific certificates at the Adolescence and Young Adulthood level. In some fields, developmental levels are joined together (for example, Early Adolescence through Young Adulthood/Art) to recognize the commonalities that hold practice together at those levels.

A third dimension comes into play in two other areas: the special knowledge associated with teaching children with exceptional needs in the first instance, and the special knowledge associated with teaching those for whom English is a new language in the second.

Standards and Assessment Development

Standards committees are appointed for each of these certificate fields. The committees are generally made up of 15 members who are broadly representative of exemplary professionals in their field, and a majority of whom are teachers regularly engaged in practicing with students in the field in question. Other members are typically experts in child development, teacher education and the relevant discipline(s). The standards committees recommend to the National Board the specific standards for each field, which are then disseminated widely for public critique and comment and subsequently revised as necessary.

Determining whether candidates meet the standards requires performance-based assessment methods that are fair, valid and reliable and that call on teachers to demonstrate principled, professional judgments in a variety of situations. Assessment Development Laboratories (ADLs), working with standards committee members, develop assessment exercises and pilot test them with small groups of teachers. The ADLs are selected through a process of open competition and merit review and are composed of a mix of education measurement experts and educators with deep roots in the certification field. The assessment process that is emerging from the first ADLs is structured around two

key activities: (1) the compilation of a teacher's portfolio of practice during the course of a school year; and (2) participation in one or two days of assessment center activities during the summer.

Teachers prepare their portfolios by gathering student learning products and other teaching artifacts and providing analyses of their practice. At the assessment center teachers take part in exercises that are organized around challenging issues that teachers in their field face on a regular basis. The portfolio is designed to capture teaching in real-time, real-life settings, thus allowing NBPTS to examine how teachers translate knowledge and theory into practice. It also yields the most valued evidence NBPTS collects — videos of practice and samples of student work. The videos and student work are accompanied by commentaries on the goals and purposes of instruction, the effectiveness of the practice, teachers' reflections on what occurred, and their rationales for the professional judgments they have made. In addition, the portfolio allows candidates to document their accomplishments in contributing to the advancement of the profession and the improvement of schooling (be it at the local, state or national level), and to document their ability to work constructively with their students' families.

Teachers report that the portfolio is a professional development vehicle of considerable power, in part because it challenges the historic isolation of teachers from their peers. It accomplishes this, in the first instance, by actively encouraging candidates to seek the advice and counsel of their professional colleagues, be they across the hall or across the country, as candidates build their portfolios. It also requires teachers in the healthiest of ways to critically examine the underlying assumptions of their practice and the results of their efforts. This emphasis on reflection is highly valued by teachers who go through the process, as it stands in sharp contrast to the norms of their professional lives where such systematic inquiry is rarely encouraged.

The assessment center exercises are designed to complement the portfolio, validate that the knowledge and skills exhibited in the portfolio are, in fact, accurate reflections of what candidates know and can do, and give candidates an opportunity to demonstrate knowledge and skills not sampled in the portfolio due to the candidate's specific teaching assignment. For example, high school science teachers assigned to teach only physics in a given year might be hard pressed to demonstrate in their portfolio broad knowledge of biology. Given that NBPTS' standards for science teachers place high value on such capabilities, another strategy for data collection is necessary. The assessment center exercises are designed to fill this gap and otherwise augment the portfolio. The exercises sample the breadth of the content knowledge and pedagogy associated with the certificate field through authentic scenarios that allow candidates to confront important instructional matters even as they are removed from the immediacy of the classroom. Each candidate's work is examined by assessors who are themselves highly accomplished teachers in the certificate field.

NBPTS adopted this model of teacher assessment, in part, because traditional teacher tests enjoy little legitimacy in the eyes of teachers and because their validity in gauging the complexities of exemplary practice is suspect by the psychometric community as well. NBPTS believes that a valid assessment of accomplished practice must allow for the variety of forms sound practice takes, must sample from the range of ways of knowing required for teaching, and must place assessments of teaching knowledge and skill in appropriate contexts. Teaching is not just about knowing things; it is about the use of knowledge — knowledge of learners and learning, of schools and subjects — in the service of helping students grow and develop. Consequently, NBPTS believes that the most valid teacher assessment processes are those that engage candidates in the activities of teaching — activities that require the display and use of teaching knowledge and skill and that allow teachers the opportunity to explain and justify their actions.

In addition, in its assessment development work, NBPTS expects to: explore and, where appropriate, use state-of-the-art technology for assessment; ensure broad representation of the diversity that exists within the profession in all stages of the development process; engage the pertinent disciplinary and specialty associations at key points in the process; work in close collaboration with appropriate state agencies, academic institutions and independent research and education organizations; establish procedures to detect and eliminate instances of external and internal bias with respect to age, gender and racial and ethnic background of teacher candidates; select the method exhibiting the least adverse impact when given a choice among equally valid assessments; and have the certification process provide both information that will assist teachers in preparing for the assessment and constructive feedback, especially for those candidates who do not at first meet NBPTS' standards.

Once a certificate has been thoroughly tested and found to meet the National Board's requirements for validity, reliability and fairness, eligible teachers may apply for National Board Certification. To be eligible, a teacher must hold a baccalaureate degree from an accredited institution; have a minimum of three years of teaching experience at the early childhood, elementary, middle or high school level; and, where it is required, hold a state teaching license. Those who choose to participate in this year-long process usually come away stronger for the effort.

Strengthening Teaching and Improving Learning

A system of National Board Certification that commands the respect of the profession and the public can make a critical difference in how communities and policymakers view teachers, in how teachers view themselves, and in how teachers improve their practice throughout their careers. National Board Certification has the potential to yield such significant results for American education in part because it marks the first attempt to forge a national professional consensus on the critical aspects of accomplished practice in each teaching field. The traditional conversation about teacher competence has focused on beginning teachers. Yet, unless we believe that the professional development of

teachers should conclude the day novice teachers are hired, this new conversation about accomplished practice is essential.

Developing standards of accomplished practice has the potential to lift the entire profession as the standards make public the knowledge, skills and dispositions that set accomplished teachers apart from journeymen. However, converting such standards into a system for the advanced certification of teachers promises much more. A mechanism that can identify accomplished teachers in a fair and trustworthy manner can accelerate efforts to build school organizations, structures and career paths that look significantly different from the flat, undifferentiated approach that typically gives novice teachers much more responsibility than they can sensibly handle, fails to take best advantage of the knowledge, wisdom and expertise of accomplished teachers, and encourages many exemplary practitioners to leave the classroom for greater status, authority and compensation.

By holding accomplished teachers to high and rigorous standards, National Board Certification has the potential to leverage change along several key fronts. For example:

- Changing what it means to have a career in teaching by breaking the impasse between labor and management over recognizing and rewarding exemplary teachers and by making it possible for teachers to advance in responsibility, status and compensation without having to leave the classroom.
- Changing the culture of teaching by accelerating growth in the knowledge base of teaching; by placing real value on professional judgment and elegant practice in all its various manifestations; and by encouraging among teachers the search for new knowledge and better practice through a steady regimen of collaboration and reflection with peers and others.
- Changing the way schools are organized and managed by creating a vehicle that facilitates the establishment of lead teacher positions and thus provides accomplished teachers with greater authority and autonomy in the making of instructional decisions and greater responsibility for sharing their expertise to strengthen the practice of others.
- Changing the nature of teacher preparation and on-going professional development by laying a standards-based foundation for a fully articulated career development path that begins with prospective teachers and continues with novice, journeymen and, ultimately, highly accomplished teachers.
- Changing the way school districts think about hiring and compensating teachers by encouraging administrators and school boards to search for highly accomplished teachers, rather than the those who can be hired at the lowest salary, and to reward excellence in teaching.

While National Board Certification has been designed with the entire country in mind, each state and locality will decide for itself how best to encourage teachers to stand for advanced certification and how best to take advantage of the expertise of the National Board Certified Teachers in their midst. An early example of state action in

support of National Board Certification comes from North Carolina, where legislation has been enacted that provides funds to pay the certification fee for teachers who complete the process. This legislation also funds release time for candidates to work on their portfolios and prepare for the assessment center exercises and provides a four percent salary increase for teachers who achieve National Board Certification. Other states have adopted or are in the process of adopting legislative initiatives that acknowledge National Board Certification and offer incentives for certification. At the local level, to give just two examples, school districts in Boston, Massachusetts, and Rochester, New York, have agreed to absorb the fee for the assessment process and give National Board Certified teachers special consideration for "lead teacher" assignments.

As this growing support at the state and local level suggests, National Board Certification is being recognized for the rich professional development experience it has proven to be. In addition, as it provides states and localities a lever to more sensibly structure teachers' roles and responsibilities and to better organize schools to take advantage of the wisdom of our strongest teachers, National Board Certification can act in concert with other initiatives to dramatically improve education for America's youth.

Vocational educators play a crucial role in preparing young people to function successfully in the adult world they will soon enter. They build students' knowledge of leading edge technologies, their capacity to solve problems they have yet to encounter and enrich their understanding of the world of work. Because we live in a time of significant change — in education, in the world economic market place, in many of our cities, towns and families — the goals and purposes of vocational education teachers have more saliency than ever.

A New Vision for Vocational Education

Just as the contemporary workplace is an evolving one, we are also witnessing an evolution in vocational education, from a field where students worked in isolation on specific skills that were sometimes obsolete before even being tested in the marketplace, to one where students, under the guidance of exemplary teachers, work in teams on broad multidisciplinary projects. Embracing this sense of purpose, vocational educators are attempting to avoid the narrow occupational specificity of earlier times, and provide students with opportunities to envision a range of career paths in a variety of different industries.

The changes in vocational education have been fomented through a variety of public and private initiatives at the local, state and national level. At the core of many reform efforts is the belief that the "shopping mall" high school, while providing opportunities for a wide range of choices, also leaves many students adrift and without a clear and constructive focus for their educational experience, and that schools would better engage students in their own learning if there was greater coherence among the myriad of course offerings students encounter. The most recent wave of reforms are thus designed to improve the adequacy of vocational education offerings, to assure high quality instruction to all students, and to narrow the distance between vocational courses and those in "academic disciplines" by both promoting disciplinary learning within vocational studies as well as infusing "academic" studies with vocational education's emphasis on the application of theory to everyday problems.

A broad spectrum of the most successful schools in the country have begun to enhance student learning by replacing conventional teacher-centered didactic instruction with more activity-based, project-oriented methods. This trend reflects a philosophical shift in beliefs about learning, from a behaviorist viewpoint which focused on practice and repetition, to a model which views learning as the construction of knowledge and one which places a high value on instruction that encourages student initiative and inquiry. Other important features of the reforms in secondary education that have the potential to transform vocational education include: the integration of vocational and academic programs; the creation of opportunities for students to learn in real world contexts and thus better prepare them for the changing needs of the workplace; and the exposure of students to the wide range of career paths that will be available to them at the end of their secondary school experience.

Accomplished vocational teachers are at the vanguard of many of these changes and reforms. Prepared with a robust repertoire of methods, strategies and resources, in their own classrooms they put into practice alternative ways of teaching and learning that serve as a model for their colleagues and communities. For example, an in-school medical technology lab serves as a perfect vehicle for students to pursue the academic goals of a strong high school biology curriculum. Across both the traditional curriculum as well as across a range of vocational fields, models such as this have been created and put into practice by outstanding vocational teachers.

At the federal and state level new and updated legislation reflects the consensus among leaders in the field. These legislative initiatives, in addition to emphasizing the value and importance of vocational education to the lives of young people, also seek to help schools more clearly articulate the links between student's school experience and the life beyond formal schooling, when young people move into the world of work. These changes in education in general and in vocational education in particular place new demands on the nation's teachers. Embedded in the legislative reforms, for example, are recommendations for collaborative planning and teaching, integrated instruction, and close links between the school and workplace. In addition to encouraging teachers to broaden their vision of their own professional roles, these legislative initiatives by their nature may require rethinking the way schools utilize time and space.

A critical component embedded in these legislative initiatives and in the concomitant reform efforts is a vision that all students, without regard to their social or economic backgrounds, ethnicity, gender, race, exceptional need or disability should have access to high quality vocational educational instruction. Exemplary vocational educators, long accustomed to serving a diverse population of students, often provide exemplars for their colleagues and are at the forefront of forwarding the discussions of how to create programs that increase the likelihood of success for students with a wide range of interests and abilities.

The Changing Demands of the Workplace

Changes in the organization of the workplace are another pressing demand on the talent and vision of vocational teachers. Often, pushed by the demands of international competition, businesses must be prepared to shift to new processes and products quickly, sometimes retooling overnight and bringing in entirely different technologies to stay ahead of the game. Workplaces have become less hierarchical, more cooperative and team oriented, and employers value workers who are flexible enough in skills and temperament to deal with uncertainty and change, and who understand the need for continuous improvement and problem solving by those who are on the front line of creating products and serving customers. Vocational teachers are shifting their own orientation in their classrooms, programs and professional development from one less focused on a narrow body of skills, to a vision that values flexibility, cross-training, and a broad foundation of knowledge and skills that recognizes that their students will likely change careers several times in their working lives.

Adolescents in Context

Complementing this focus on change in the workplace is a knowledge of adolescent development. Exemplary teachers demonstrate genuine interest in and appreciation for adolescents and a rich understanding of the ways they grow and develop. Teachers enjoy and are challenged by the diversity, energy and earnestness of their students as they mature into young adulthood. They are intrigued by the changes in perceptions, peer and adult relationships, and the varying levels of accomplishment that characterize young people. Because excellent teachers seek to nurture student development within school and on the job, and may work with them for several years, they come to know their students well and are prepared to serve as advocates, adult role models and advisors.

The face of the American classroom is changing. A significant linguistic and cultural shift is underway in the composition of students who fill our classrooms, providing both opportunity and challenge for teachers. A growing percentage of students entering school come with a home language other than English. Although migration and immigration have always been central to life in America, the sheer numbers and variety of cultures now found in urban, suburban and even some rural settings challenges teachers to adapt their practices to ensure that all students, including those with exceptional needs or for whom English is a new language, gain full access to the curriculum.

Coupled with these demographic shifts are changes in family circumstances and the difficult path to adulthood faced by many of today's youth. The number of students raised in poverty has doubled in the last two decades. Many students grow up in blighted neighborhoods where drugs, crime, substandard housing, homelessness and despair are all too prevalent. Although these realities carry new responsibilities, exemplary vocational teachers can see what is unique and what is similar about each of their students. They work diligently to weave all students into the fabric of the classroom. Such teachers face these challenges head-on, often using the community as a laboratory of investigation.

Despite the stated goals of a given school, most students and families view schooling as serving essentially a vocational purpose, and this is true whether formal schooling is ended with a high school diploma or students seek post-secondary options. As the gaps in earnings among high school dropouts, graduates and those with some kind of post secondary credential continue to increase, so do the consequences of schooling decisions. Should I take algebra? Will the general science class be enough? How important are grades? Where will I acquire technology? These questions and the choices students make in answering them have the potential of opening or foreclosing career paths, often irreversibly. Accomplished vocational teachers are prepared to guide students as they begin to wend their way through the messy and often confusing paths toward building an adult life.

The Structure of the Vocational Education Certificate

While all exemplary vocational educators share a common body of knowledge, skills and dispositions, they are a varied group who also command specialized areas of expertise that set them apart one from another. For example, agriculture teachers and health services teachers both depend on backgrounds in science and understand the challenges students face in making the transition to the world of work, but they also each have particular knowledge of their field and related pedagogical approaches that are distinctly their own. In seeking to define these subspecialties within vocational education the National Board has attempted to navigate a course between two hazards — (1) the creation of scores of specialties that would suggest a narrowly gauged instructional course for students and an administratively infeasible certification system for NBPTS; and (2) the establishment of a unitary certificate that denies the existence of critical areas of in-depth expertise that are crucial to accomplished practice.

The National Board is not the first to struggle with this dilemma as regular debates in the states, in the research literature and within the profession around this question can readily be found. NBPTS has sought to take advantage of these discussions by looking to their findings for criteria that might appropriately be applied to the design of this system of advanced certification for teachers. For the moment, the preeminent idea behind the structure advanced in this draft is the notion that vocational education should prepare students, not just for a first job, but for a career with some promise within a particular sector of the economy. Hence, teachers need to be similarly broadly grounded in their outlook and their practice to afford their students this more ambitious sense of possibilities and the wherewithal to take productive first steps in the marketplace.

This led to the identification and application of the following criteria to this matter: there should be a common, coherent and substantial body of knowledge associated with each cluster of industries; there should be a substantial number of teachers whose practice can be encompassed within each category; the fields should not be so broad that expertise about any one of them is beyond the grasp of exemplary teachers; each sector should be readily distinguishable from all others; current vocational education teachers should be able to see themselves functioning well within one or more categories; and encouraging teachers to develop expertise in each cluster is a sound decision from an education and policy perspective.

With these ideas and constructs in mind the Vocational Education Standards Committee advances the following eight fields as areas within which teachers should be able to seek National Board Certification as accomplished vocational educators: Agriculture and Environmental Sciences; Arts and Communication; Business, Marketing and Information Management; Family and Consumer Sciences; Health Services; Human Services; Manufacturing and Engineering Technology; and Technology Education.

The Vocational Education Standards Committee has drawn on the critical ideas embedded in key legislation, as well as on the experience of accomplished teachers,

researchers and other vocational education professionals to develop its standards for exemplary practice in this field. The National Board recognizes and wishes to capitalize on a powerful convergence of ideas that has emerged from an extensive process of debate and discussion. Those discussions continue today. Though this consensus is still relatively new, it is hoped that these standards will serve as a catalyst for change in the quest for even stronger vocational education for America's students.

Developing High and Rigorous Standards for Accomplished Teaching

An essential tension of describing accomplished practice concerns the difference between the "analysis of" and the "practice of" teaching. The former tends to fragment the profession into any number of discrete duties: designing learning activities, managing the classroom, monitoring student progress and so on. Teaching as it actually occurs, on the other hand, is a seamless activity. Everything the accomplished vocational education teacher knows through study, research and experience is brought to bear daily in the classroom in the form of dozens of decisions that shape the learning environment and influence student performance. These judgments range from the tactical to the strategic. They frequently require balancing the competing claims of several important educational goals; they depend on accurate observations of particular students and settings; and they are subject to revision based on continuing developments in the classroom. They also reflect the improvisational artistry that characterizes exemplary teaching. In reality, functions such as planning learning activities, motivating effort, assessing progress or maintaining discipline do not happen in isolation. Rather, they are skillfully interwoven strands in the single, sturdy fabric of excellent practice.

The paradox, then, is that any attempt to write standards that "take apart" what accomplished teachers know and are able to do will, to a certain extent, diminish the holistic nature of how teaching actually takes place. Nevertheless, the fact remains: certain identifiable commonalities characterize the many forms of accomplished practice that all vocational educators employ. These critical aspects of practice are spelled out in the form of twelve standards, the descriptions of which make up the heart of this document.

Of course, these specific standards are not the only way to describe accomplished vocational teaching. Nor is each standard of equal weight. No linearity, atomization or hierarchy in this vision of excellent teaching is implied. Instead, the standards are presented as aspects of teaching that are analytically separable for the purposes of this document, but which, in fact, reinforce and mesh with one another in reality.

The format of the report follows a two-part approach to describe each standard:

I. ***Summary of the Standard*** — states succinctly one aspect of accomplished vocational education teaching. Each standard is couched in terms of observable teacher actions that have an impact on students.

II. ***Elaboration*** — provides texture for the standard along with an explanation of what teachers need to know, value and do in order to satisfy the standard at a high level. This includes descriptions of their orientation to students, their distinctive roles and responsibilities, and their stance toward a range of ethical and intellectual challenges that regularly confront them.

In addition, throughout the report you will find vignettes that present case histories from classrooms illustrating exemplary practice and demonstrating how classroom decisions integrate various considerations and cut across the standards document. If the standards "pull apart" accomplished teaching into discrete elements, the vignettes are intended to put them back together in ways more clearly recognizable to teachers. Because the National Board does not believe there is a single "right" way to teach vocational education students, these vignettes are meant to be illustrative of exemplary teaching, not a cookbook of correct practice. Indeed, the stories presented here are but a handful of the thousands that could have been written describing accomplished vocational education practice.[1]

Finally, a word about the order of presentation. The twelve standards have been organized around the critical nexus of education — student learning. They are divided into three categories: (1) teacher actions that *create* the conditions for productive student learning; (2) teacher actions that directly *advance* student learning in the classroom; (3) teacher actions that indirectly support student learning through *professional development and outreach* initiatives.

1. Please note that this current draft of the Vocational Education standards does not include the vignettes discussed above.

Overview

The requirements recommended by the Vocational Education Standards Committee for National Board Certification are organized into the following twelve summary standard statements. The standards have been ordered to facilitate understanding, not to assign priorities. They are each important facets of the art and science of teaching, which often occur concurrently given the seamless quality of highly accomplished practice.

Creating a Productive Learning Environment

I. Knowledge of Students
Accomplished vocational teachers are dedicated to advancing the learning and well-being of all students. They personalize their instruction and apply knowledge of human development to best understand and meet their students' needs.

II. Knowledge of Subject Matter
Accomplished vocational teachers command a core body of general vocational knowledge about the world of work in general and the skills and processes that cut across industries, industry specific knowledge, and a base of general academic knowledge. They draw on this knowledge to establish curricular goals, design instruction, facilitate student learning and assess student progress.

III. Learning Environment
Accomplished vocational teachers efficiently manage their classrooms and create an environment that fosters democratic values, risk taking and a love of learning. In this environment, students develop knowledge, skills and confidence through contextualized learning activities, independent and collaborative laboratory work, and simulated workplace experiences.

Advanced Student Learning

IV. Advancing Knowledge of Vocational Subject Matter
Accomplished vocational teachers foster experiential and performance-based student learning of vocational subject matter by creating important, engaging activities for students that draw upon an extensive repertoire of methods, strategies and resources. Their practice is also marked by their ability to productively integrate vocational and academic disciplines.

V. Workplace Readiness
Accomplished teachers develop student career decision-making and employability skills by creating opportunities for students to gain understanding of workplace cultures and expectations.

VI. Managing and Balancing Multiple Life Roles
Accomplished teachers develop in students an understanding of the competing demands and responsibilities that are part of the world of work, and guide students as they begin to balance those roles in their own lives.

VII. Social Development
Accomplished vocational teachers develop in students self-awareness and confidence, character, leadership and sound personal, social and civic values and ethics.

VIII. Assessment
Accomplished vocational teachers utilize a variety of assessment methods to obtain useful information about student learning and development, to assist students in reflecting on their own progress and to refine their teaching.

Professional Development and Outreach

IX. Reflective Practice
Accomplished vocational teachers regularly analyze, evaluate and strengthen the effectiveness and quality of their practice through life-long learning.

X. Collaborative Partnerships
Accomplished vocational teachers work with colleagues, the community, business and industry, and postsecondary institutions to extend and enrich the learning opportunities available to students and to ease school to work transitions.

XI. Contributions to Professional Community
Accomplished vocational teachers work with their colleagues and with the larger professional community both to improve schools and to advance knowledge and practice in their field.

XII. Family and Community Partnerships
Accomplished vocational teachers work with families and communities to achieve common goals for the education of all students.

In the pages that follow, the reader will find full explications of each standard that include discussions of the knowledge, skills, dispositions and habits of mind that allow teachers in this field to practice at a high level.

Creating a Productive Learning Environment

The following three standards form the knowledge base of accomplished vocational education teachers. The requisite knowledge of students, subject matter and the learning environment form a foundation for the remaining standards. Only by knowing students well can teachers make instructional decisions appropriate to their unique individual needs. For teachers to practice at a high level, knowledge of students must be coupled with a command of subject matter and the ability to create a productive learning environment.

Standard I: Knowledge of Students

Accomplished vocational teachers are dedicated to all students. They personalize their instruction and apply knowledge of human development to best understand and meet their students' needs.

The vocational classroom, like the world of work, is often a complex, multi-faceted place, with a range of tasks and activities competing for attention, and with a range of students with varying needs ready to take them on. Whether instruction is individualized, organized around teams, or focused on the class as a whole, teachers must stand ready to personally engage each student in the work at hand. To accomplish this, teachers[2] must know their students well. But, knowing them well cannot be limited to knowledge of their backgrounds or to the prior learning or experiences. Also included is a knowledge of student career interests and opportunities, as well as the repertoire of approaches that each student takes to his or her own learning. Even this extensive base of knowledge is insufficient without a deep concern for and commitment to all students.

Dedicated to All Students

Like exemplary teachers in all fields, vocational teachers are dedicated to the education of all students. Their actions are fueled by a commitment to see their charges make a successful transition from the world of schooling to work. Vocational educators also have a rich history of welcoming a diverse clientele into their classrooms. They tailor instruction and assessment to equitably meet the needs of all students, including those with special needs due to disabilities or other unique characteristics or qualities related to culture, gender or language. They challenge students with high expectations, encouraging them to make strides no matter what their level of competence is at the outset of the school year.

In order to meet students' needs and subsequently bring them to new depths of understanding and skill, teachers are aware that each student learns in his/her own way. Teachers are well-grounded in learning theory and have a rich repertoire of methods to engage students productively in learning. They take great pride in their ability to motivate young people, playfully cajoling or quietly observing individual students as needed. This understanding of what students know and can do combined with their understanding of student attitudes, beliefs and values allows them to design meaningful instructional tasks for all students. It also provides them with the ability to determine proper student placement, especially where programs are carefully sequenced.

2. All references to teachers in this document, whether explicitly stated or not, refer to accomplished vocational education teachers.

Using a Systematic Assessment Process for Understanding Student Needs

Teachers employ a range of systemic methods to find out about their students' needs. They are skilled at assessing students in the context of work, often bringing individual students into a given skill, process or technique gradually, and creating the opportunity to personally judge student achievement and readiness for the next steps. Comfortable in the role of coach to student worker, or apprentice to meister, these teachers learn to understand the influences of students' strengths and interests, as well as the way culture, and prior learning experiences or background shape classroom behavior. When needed they are also able to call on more formal assessment to help make judgements about students (see Standard VIII — Assessment). These observations and understandings ultimately guide teacher decision-making about content and processes toward decisions that are the best fit for a particular group of students.

Alert to the Particular Needs of Individual Students and the Changing Nature of the Labor Market and Workplace

In addition to bringing a wide variety of skills, talents and abilities to the classroom, most students are also greatly concerned about their futures. Therefore, the vocational classroom is centered not only around student needs, interests and academic preparation, but also around future aspirations, vocations, workplace values and life skills. In order to create a learning environment to address both the commonalties and the differences that characterize their students, teachers are well versed in areas of particular importance to adolescents and young adults, including the requirements of local businesses and industries and an awareness of potentially available work; the workplace environment of said businesses; and the need for, desirability of and availability of further educational opportunities. To use this knowledge effectively, these teachers are skilled at forming relationships with students, knowing them as well as a coach may know an athlete.

Teachers know that school is a time of exploration and discovery for their students. It is also a time where the development of a positive self-image rests, in large part, on acquiring and demonstrating skill and competence in school. They help students gain a sure footing by exploring problems and issues they have never previously confronted: problems that are likely to be encountered in the workplace, that develop their knowledge and skill base, and that yield a sense of satisfaction when they are well solved. Teachers acknowledge the importance of working simultaneously on these goals. For example, while they create opportunities in their curriculum that allow students to gain mastery of a set of specific skills, they also insist that students be exposed to the range of career possibilities related to that skill so that they may consider whether or not such choices are well matched with their interests and talents.

Often teachers allow students to select their own project topics or pursue individual approaches to solving a problem or approaching a task. They do so because they understand that this creates ownership and engagement on the part of the student, and allows the teacher to come to know the students better. Many times students select projects that they perceive will have a direct impact on the community and its members, for example starting a student-run health clinic, or opening a restaurant that serves food appealing to teenagers. Charged with the mission of connecting students with their futures, teachers are mindful that such decisions are often informed by the ideas of peers. They, therefore, make sure that, where necessary, competing perspectives are presented. Throughout the process, teachers carefully guide students to ensure that important ideas, concepts and facts are addressed and do so while concurrently nurturing student initiative.

Teachers know that in order to best meet students' needs and bring them along, they have to start with where the students are — their knowledge, understandings, skills, interests and inclinations — and move them forward to a set of worthwhile goals and accomplishments. In this way, the curriculum is "negotiated" between students and teachers. Consequently, teachers reconfigure the curriculum regularly, for in addition to aligning the curriculum with students' needs, they also seekto be responsive to the changing demands of the labor market.

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Standard II: Knowledge of Subject Matter

Accomplished vocational teachers command a core body of general vocational knowledge about the world of work in general and the skills and processes that cut across industries, industry specific knowledge, and a base of general academic knowledge. They draw on this knowledge to establish curricular goals, design instruction, facilitate student learning and assess student progress.

A sound foundation in content is the key to all exemplary teaching. In the field of vocational education, the whole notion of what it means to know subject matter has changed. Previously, the focus of a vocational teacher's practice was on the development of skilled artistry within a specific occupation. Consistent with the philosophy embodied in many of the most forward-thinking vocational policy pronouncements, vocational education has been reconceptualized to emphasize two distinct bodies of knowledge that are woven together by exemplary teachers into a unified vision of accomplished practice and used to prepare students for meaningful and rewarding work in high-performance settings. The first of these strands is a common core of vocational knowledge, and includes general academic content, workplace skills and a knowledge of skills and processes that cut across industries. The other is knowledge of a specific career cluster: groups of industries which are related by virtue of common production procedures, distribution methods and/or underlying disciplines.

COMMON CORE OF VOCATIONAL KNOWLEDGE

All exemplary vocational teachers have command of a common core of vocational knowledge and skills. One subset of this knowledge is often referred to as workplace basics or employability skills, and includes such important qualities needed to function in the workplace as interpersonal skills, critical thinking abilities, basic communication and mathematical skills and familiarity with the latest in technology, including computers and automation. In addition to these skills teachers have general industry knowledge, knowledge of a core set of disciplines that allow them to integrate academic and vocational education, and professional knowledge about programs and trends in vocational education. These areas are discussed in the sections that follow.

Understanding Workplace Basic Skills

Exemplary vocational teachers are knowledgeable of the many general skills and attitudes that need to be inculcated in students to make them successful in employment and in life. This knowledge can be clustered into six key areas: interpersonal skills (such as negotiation, working on teams, leadership and understanding the rewards and difficulties of working with others who are in some way different from you), resource allocation (which includes creative thinking and problem solving), technology usage, information acquisition and usage, systems operation, and health and safety issues.

In order to help assure their students will meet with success in the workplace, teachers place particular importance on helping students develop the skills associated with working with other people, be they colleagues on a team, suppliers, customers, supervisors or subordinates. Teachers have first-hand knowledge of the demands of workplaces, including collaborating with others, responding to client needs, leading a team, and working well with people from different walks of life. They help students understand the importance of customer relations, that production takes the cooperation of many people — sometimes people who have

different views and values than they do. Organizing their classrooms with attention to such interpersonal relationships — by having students work in teams, share production tasks and model the kind of client-centered courtesy that employers seek — is one way in which they create well-rounded, competent and self-directed students.

Key to successful completion of work in any industry is the ability to use one's mind well. Teachers have a repertoire of strategies and approaches for projects and activities which are useful in helping students develop the judgment, decision-making and problem solving central to workplace and life success. They themselves possess critical thinking ability, and model for their students the kind of analytic thinking they value. They view the projects and tasks they create for students as existing beyond a set of discrete skills. They see them instead as an opportunity for the development of student reasoning abilities, including the abilities to evaluate risks, examine alternatives, recognize trends and deal with uncertainty. They know that the world of employment offers ample opportunities for those who can think through workplace issues thoroughly, are able to take direction, work collaboratively with others and possess occupational/career competencies.

Teachers also know about the basic academic skills that underlie all workplace environments and know how to work with students to ensure they will enter the workplace with these skills soundly in place. These include the communication skills necessary to convey product or process information, or to discuss important issues in an office, clinic, factory, business, family or farm. They know the mathematics and science concepts fundamental to most industries, and particularly those germane to the industry in which they have specialized knowledge. They are also knowledgeable about technology usage, particularly about the types of technology that are common to most workplaces (e.g., computers and telecommunications, automation and robotics) and know about the most common applications of these in industry.

Teachers know that many job processes are dependent on the ability to acquire and use information well, and are well-versed in many of the techniques that are commonly used to gather, store and retrieve the data that is needed in many work settings. They understand how different industrial systems operate across the economy and the kinds of roles workers play in making those systems run well. Finally, they know about the health and safety issues that workers commonly confront on the job, such as the kinds of protective clothing that might be required when handling toxic substances, and keep current on the evolving knowledge and controversies in this area.

They also understand that in addition to these workplace skills, the most important outcome of a first rate program is the development of students with a sense of responsibility, self-confidence, well-honed social skills and integrity. Teachers know how to design opportunities for the development of such aspects of personal character in ways that recognize that such traits are best developed in the context of real experience, including the chance to try and fail and to finally demonstrate successful growth as a potential employee.

Commanding General Industry Knowledge

In addition to workplace basic skills, exemplary teachers have knowledge of the general skills and processes which are found in all industries or career clusters. They understand the process of acquiring a craft, the bases of different industries, and the process of exploring a career and planning for the future. They understand students may need a variety of exploratory experiences to help their future decision-making and are adept in designing such experiences. They are well versed about the basic purposes, skills and issues central to different

careers. For example, they know that students who are especially interested in working with the natural world might find a variety of attractive career options within those clustered around agriculture and environmental sciences. Or, if students approached them interested in the built environment, they would be able to direct them toward programs that would develop skills needed to pursue a range of employment opportunities in manufacturing and engineering technology.

As part of their general industry knowledge, teachers have a basic understanding of the range of fields, occupations or occupational clusters that make up vocational education and are able to introduce students to them. Within the cluster of careers in which they specialize, they have a breadth of understanding of the basic purposes, issues, skills, nature of the work and the major concepts that undergird that particular industry. These teachers also are knowledgeable about workplace economics. They understand labor market conditions, macroeconomic factors of the United States and global economy, the basics of supply and demand, current employment patterns, and projections and trends for future employment. They stay current about general structural changes in the economy, which at the present time would include industry-wide trends such as preferences for multi-skilled workers, part-time employees and quality assurance.

Teachers understand how to use this knowledge to help students make career decisions. For many students, the task of choosing an area of focus is not easy. Within a given industry, teachers understand which career paths and occupational structures are promising, and which may be more limiting. They see their role, in part, as serving as a career counselor to their students. They draw on their industry knowledge and their knowledge about the way young people think about their futures to guide students as they begin to make career choices. Understanding that students often make decisions based on knowledge or aspirations circumscribed by their life experiences, they strive to expand students' horizons and open their eyes to a variety of rich and rewarding possibilities. They help students recognize potential dead ends and, because of their general industry knowledge, are able to guide students in more promising directions.

In order to be fully effective in these roles, teachers must also know about specific program structures and key legislation germane to vocational classrooms. For example, these teachers are knowledgeable of articulation agreements and relationships with other institutions, elementary school through post-secondary. They know about transition programs that connect students' secondary schooling experiences with the workplace or further educational opportunities and about the quality of each. They are also familiar with principles that lead to the design and delivery of successful cooperative education methods, including youth apprenticeship programs, internships, job shadowing and school-based enterprises. They establish and maintain active advisory committees to guide their work in curriculum and in developing simulated and off-site experiences for students.

Beyond career decision-making, teachers understand firsthand the process of "growing into" an industry, including such notions as apprenticing alongside a meister and gradually assuming more responsibility. They know how to help students get a sense of the operation, rhythm, roles and tasks that may be required of them in a given segment of an industry. They are aware that for novices it is difficult to see beyond one's specific task. Because teachers understand the big picture themselves, they know how to design activities that allow students to understand individual work in the context of broader industry goals. Teachers use this knowledge to organize instruction both in school and in work-site learning experiences that enables students to more effectively learn how to acquire skills, gain a perspective on a career and embark successfully on their first jobs.

Integrating Vocational Content With Other Disciplines

By its nature, a sound approach to vocational education demands the infusion of the core disciplines in the school curriculum — English language arts, history and social studies, mathematics and science — into the vocational education curriculum. Teachers not only have to understand these disciplines, they must also know how to select from among the concepts and skills that comprise these disciplines those that will allow them to create powerful learning experiences for children. This foundation allows teachers to structure projects, courses and activities soundly and to know when a student may need additional academic support. In most cases, despite extensive personal knowledge, a comprehensive approach demands collaboration with colleagues. For example, in a Geo-Space Academy, teachers with expertise in math and science might collaborate to design a unit and help students present information and results of their experiments on space-related projects (including the use of hydraulics in space, robotics, earthquakes on various planets) to members of the business community. Their English teacher colleagues might work alongside them to help their students learn to formulate interview questions, use effective follow-up questioning strategies, and read historical accounts of space exploration. In collaboration with social science colleagues they might consider the controversies that have surrounded manned space flights. In science, topics might include basic astronomy, spectroscopy, gravitation, satellite motion and prospects for a space-based telecommunications industry. Such collaborations can be as limited as calling on colleagues for curricular assistance and information, or as expansive as designing inter-disciplinary units for an entire team of teachers. Whichever, vocational teachers stand ready to work with colleagues to further the goals of integrating vocational and academic content.

To integrate curriculum as an independent teacher or as part of a collaborative team, exemplary teachers have a breadth of knowledge in the core curriculum of the school — of English language arts, history and social studies, mathematics and science. As part of their specialized expertise as vocational educators they may also command a greater depth of knowledge in one or more disciplines closely related to the career cluster in which they specialize. For example, while all teachers are familiar with the fundamentals of science, it is understood that due to the nature of their specialty, teachers in the health services area have more background in the biological sciences. The following sections outline the knowledge base of teachers in the core curricular areas.

English Language Arts

Because communication is central to all employment, exemplary vocational teachers have a sound background in the English language arts. They understand that facility in reading, writing, speaking and listening crosses curricular boundaries, and work to incorporate language learning into their students classroom experiences. They emphasize the usefulness of these skills in student internships, work-based learning sites and in future employment positions. They model the use of standard English in their speaking and writing and help students understand its critical importance in the workplace.

These teachers understand the full range of value inherent in writing — from the development of thinking skills to its usefulness for the expression of both personal and work related ideas. They recognize the importance of students becoming adept at writing for different purposes. Teachers understand the range of situational contexts that will apply to many of their students' future workplaces — the way, for example, that grammatical conventions are often dropped in advertising, or the way the language of a technical

report would differ from the language of a letter to a client. They help students understand the appropriate form that is dictated by a specific audience, and, also, work with students to understand the importance of the individual's role in making decisions about appropriate language use. Although they lead students to develop their own useful and comfortable approaches to writing, they also make sure students become adept at writing particularly suited for the workplace, such as technical reports. They are knowledgeable of the specific writing applications appropriate to their industry. They encourage experimentation and provide students with many different writing experiences — keeping journals, writing work plans, letters to businesses and customers, advertisements and numerous other activities that use writing to discuss products or services. In order to provide students with responses from a variety of sources and to allow them to share and explore their thinking and writing with different audiences, they arrange opportunities for students to write in different settings — on their own, in groups, with direct teacher input. They understand how effective writing develops, how to use and explain grammatical conventions and use this knowledge to assist their students in becoming more effective writers.

In addition to writing, teachers have a solid grounding in the important ideas, concepts and strategies central to developing expertise in reading and oral discourse for different audiences. They know how to support the oral language development of their students, and, in their teaching, foster and support language acquisition and development, especially as it relates to effective communication. They know that skill in reading develops over a lifetime only when people continually extend their reading experiences. They know how to work with students to help develop their skill at text interpretation, including how that process differs with the nature of the material or the purpose of the reading task. Within their classes they direct their attention to helping students learn to interpret materials common to their industry area. Of interest is student comprehension, analysis and application of a variety of materials, including manuals, records and technical papers, in addition to more traditional forms of reading.

History and Social Studies

Exemplary vocational teachers have a knowledge base in history and the social studies including geography, political science and economics in general, and in particular in strands of these disciplines which are germane to the world of work. Teachers stay informed of current social, political and economic questions and understand how these questions fit into the context of the sector of the economy in which they specialize, its labor issues and related economic issues as they affect industrial development and productivity. They know the history of work and labor, including the events and issues that led to the development of organized labor unions in the United States. They know how these questions interconnect, and they help students appreciate these relationships so they learn how to make informed and reasoned decisions, both as participants in democratic institutions and as members of labor or management. They understand the workings of the United States economy, its effects on industry and the prospects for employment, particularly in their local communities. This understanding involves an awareness of international trade and competition and how the economies of other countries can directly impact the economy of their own communities. They understand how a range of global issues affect the workplace, such as the way the value of the dollar on the world market might benefit or harm the productivity of an individual factory, or the ways in which international law governing copyright influences decisions in the production of media.

They also know the economic issues that will affect students in their personal lives, such as the challenges that face the individual consumer. They are grounded in the major historical issues that have faced the United States and its people, and are also aware of the nation's place in the world and of the contributions to the fabric of the nation of many cultures. They may focus student work on major historical and economic themes, issues, people and events that have relevance to the project or field of study at hand. Another area of focus is on the psychology and sociology of the workplace, specifically helping students to be able to make sense of data, studies and reporting about the organization of the workplace and the rewards and stresses that will affect them as workers. Ultimately, these teachers use the study of history and the social sciences to establish a learning environment that models democratic values, contributes to a student's appreciation and respect for diverse viewpoints, and encourages the growth of leadership skills and abilities. Furthermore, teachers use history to help students understand the labor, economic and social issues that have influenced the evolution of industries and that provide perspective on the economics, sociology and politics of today's workplace.

MATHEMATICS

Exemplary vocational teachers have specific knowledge about the foundations of mathematics applicable to their vocational area of expertise, as well as a general knowledge of all areas of mathematics, including number systems and theory, algebra, geometry, statistics and probability, calculus and discrete mathematics. Applied mathematics is a central feature of a great number of, if not all, the career paths students will follow, whether they end up responsible for managing the daily cash flow at a retail outlet, designing a building, or interpreting a graphical analysis of cost trends. Vocational programs give teachers a unique opportunity to develop mathematical skill in context, and teachers help their students achieve a solid foundation in the range of mathematical ideas and operations as well as in the problem-solving skills they need to address commonplace issues. They are able to help students understand the use of numbers in a variety of settings and help them to begin to think mathematically: to form and solve problems; to conjecture and discuss in mathematical terms; to recognize patterns; and to understand mathematics well enough to use it as a tool of communication.

They foster in their students comfort and confidence with mathematics as a tool to accomplish the work of their industry and of the personal economics of their homes and families. As part of the overall problem-solving strategies students use in product design and creation, they investigate the reasoning behind mathematical claims and learn to solve a wide range of practical problems. They know how to apply their mathematical knowledge in a variety of situations beyond computation, and can explain their thinking to others orally, in writing and through the use of graphical representations.

SCIENCE

Exemplary vocational teachers are knowledgeable about a variety of scientific principles and properties applicable to all areas of vocational education. In the physical sciences these include the basic properties of matter and principles governing its interactions; the forms energy takes, its transformations from one form to another, and its relationship to matter; motion and the principles that explain it; the nature of atoms and molecules; and the forces that exist between and within objects and atoms.

In the life sciences they know about the diversity and unity that characterize life, the genetic basis for the transfer of biological characteristics from one generation to the next, the structure and function of cells, the life cycle (particularly in reference to the

human organism), the dependence of all organisms on one another and on their environment, the cycling of matter and flow of energy through the living environment, and the basic concepts of evolution of species.

They are also knowledgeable about earth and space sciences, including the origin, composition and structure of the universe and the motion of objects in it, the uniformity of materials and forces found everywhere in it, the motions of the earth and the materials and systems that compose it, the processes that shape the earth's surfaces and the relation of these cycling processes to the living environment. They understand the relationships of these sciences to one another and to other disciplines. They use their knowledge of science to examine and understand the changes in today's world and to help students do the same.

Teachers approach science as an integrated field. They engage their students in considering the relationships among science, technology and society and how these relationships are changing their lives and shaping their values. For example, they encourage multi-disciplinary approaches to the study of topics, such as the impact of robotics on a changing world and the way in which developments in automation may effect the way they do their jobs in the future.

They create opportunities for students to act, think and communicate as scientists. They frame instruction to encourage students to study, question and explore ideas, topics and concepts. They ask questions that require students to probe important issues and think through a range of responses. As with mathematics, the process of science mirrors the problem solving strategies used in vocational classrooms. Teachers engage students in the techniques of gathering, organizing and evaluating scientific information related to projects. Students build their knowledge of the world when they are confronted with problems that challenge their creativity and imagination and when they have the opportunity to compare their ideas with the hypotheses of others. Their students plan projects, ask questions, make observations, interpret data and draw conclusions and do so in a physically and intellectually safe manner. Through these experiences students learn to extend methods and skills of scientific inquiry to their careers of interest, while developing a scientist's appreciation, curiosity and respect for empirical evidence.

INDUSTRY SPECIFIC KNOWLEDGE

Coupled with the common core of knowledge described above, exemplary teachers have command of industry specific knowledge. This knowledge can be separated into two key aspects: in-depth knowledge of particular aspects of the industry and a breath of knowledge that cuts across all aspects of an industry.

Teachers are knowledgeable about the subject matter in their field, including new developments, findings and technology. Given how quickly fields change, nothing could be more crucial; therefore, they find ways to stay abreast of current technological advances, changes in the workplace and shifts in consumer markets. They do so by keeping one foot in the schools and the other grounded in the workplace. They read journals, talk frequently with industry experts and may arrange for their own externships. They may also keep up with their field through part-time consulting, by spending a significant amount of time seeking out work-based learning experiences for their students, or by owning their own business. They know their classrooms can be living laboratories only if they themselves are continually engaged in their industry. They are also cognizant of their field's definitions of competence, including industry skill standards. They know what students need to know and be able to do in order to demonstrate competence in the field, secure an initial job and advance in the field.

Exemplary teachers have a broad understanding of the sector of the economy in which they specialize, including the necessary planning, management, finance, technical and production skills; underlying principles of technology; and related labor, community, health, safety and environmental issues. Such knowledge is important not only to inform decisions about curriculum design, but also because teachers understand that some students may be too immature to make permanent career decisions and therefore need to be exposed to the wide spectrum of opportunities within a given career cluster. Teachers also know it is difficult for students to imagine a future other than the options they see in their immediate surroundings. By providing them with knowledge and experience in many aspects of a career cluster, students gain capacity, understanding and habits of mind that can often be transferred to another industry. For example, in addition to learning the specifics of food production in a culinary course, students might also learn the different jobs involved in planning, designing and running a restaurant through experiences in school-based enterprises. Likewise, in a building-trades academy, students may learn about architecture, engineering, interior design, planning and housing policy, in addition to carpentry, masonry, plumbing and electricity. In addition to knowing about prospective occupations such as soil technologist, paper products manufacturer or greenhouse owner, agriscience teachers are knowledgeable of agriculture as a system, and of the economic and social role it plays in the local community, state, nation and world.

Accomplished vocational education teachers are well versed in the subject matter of one of seven broad economic sectors or in an eighth area that is distinctly different from these others. The areas are: Agriculture and Environmental Sciences; Arts and Communication; Business, Marketing and Information Management; Family and Consumer Sciences; Health Services; Human Services; Manufacturing and Engineering Technology; and Technology Education, each described below. Technology Education is set apart because these teachers do not focus on specific careers, but on the development of skills that have application in many industries.

What follows is a description of teacher knowledge about each of the career cluster areas. Within each cluster they know the range of careers that are available to students and are able to guide students toward choices that are promising, of interest and appropriate.

Agriculture and Environmental Sciences

The careers in this area share in common a focus on natural resources and include such areas as agriscience, animal science, agricultural business management, agricultural mechanics, earth sciences, environmental sciences, fisheries management, forestry, horticulture and wildlife management. In addition to a strong knowledge base in the life sciences, teachers in this cluster also know about the issues related to the production of food and other products in these fields, and about a range of other related issues, including finance, processing, marketing, distribution, supply for production, management of land and water, and the social and political dimension of natural resource systems.

Their knowledge is centered around the key themes for environmental science which are food and fiber systems; the historical, cultural and geographic significance of products for a specific region; the interdependence of the environment; animal husbandry; and food, nutrition and health.

Teachers also have specialized knowledge of one of the specific areas within this cluster in a way that allows them to guide students toward successful employment in that area. For example, in wildlife management, teachers understand the way habitat works for a given animal; understand macro- and

micro-ecological systems, including the natural systems that work to keep them in balance; the different theories and practices in species management, including controversies over the best ways to maintain, increase or decrease numbers or reintroduce depleted species to a range; the tension between preservation and development and the competition for habitat; and other political and social issues related to the management of wildlife.

Arts and Communication

This cluster of careers includes some that have immediate appeal to many students, such as being an artist or performer. Teachers expose students to the array of career possibilities that exist in arts and communications, some of which are high profile and especially demanding and others which are not. Though this field encompasses many industries, what unifies them is a focus on the creative use of symbolic or literal language to communicate ideas. Careers in this sector can be gathered into three major categories: media arts (which includes film studies, music and video production, and radio and television broadcasting), writing and related arts (which includes journalism, translation, library sciences and services, advertising and public relations), and graphic arts (which includes fine arts, graphic design and production, and book design and production).

Teachers in these fields are knowledgeable about communications in all its varied forms, including a variety of broadcast and printed media. They understand the processes and equipment that go into the production of various media. Because so much of the work in this industry involves communication, teachers in this field are skilled users of language and understand the conventions and styles that are employed across the spectrum of potential jobs. For similar reasons, they also know the fine and performing arts — music, visual art, dance, creative writing and theater. They have a clear aesthetic sense, know how to mentor students as they grow in their skills and know the kinds of tools and techniques that will be needed in order to gain employment. For example, graphics arts teachers know that in addition to being skilled in a range of traditional board skills such as silkscreening, today's graphic artist must come to the workplace ready and able to use computer-based graphic design programs. They are familiar with the software that is currently used in the industry and know how to help students become proficient in its use. Also, because so much of the work in the industry involves public presentation, graphic arts teachers also know the kinds of communication skills that make presentations effective and persuasive.

These teachers also believe that successful employment means being aware of the current trends and sensibilities across the industry. They therefore strive to know about and understand the direction the industry is taking, and, where needed, help students balance between developing their own sense of style and gaining an awareness of the tastes of the day.

Business, Marketing and Information Management

Within this sector the multitude of career paths about which teachers are knowledgeable fall into four basic career areas: computer science and information systems; business management; marketing; and accounting and finance. Teachers command a knowledge base to prepare students for careers within these four areas. For example, exemplary teachers who prepare students for careers in computer science and information systems have command of the skills and techniques associated with office automation and telecommunications including design, programming, systems analysis and information management and security. To meet the growing demand of high performance organizations for a well-trained workforce, these

teachers are knowledgeable of the leading-edge technologies in telecommunications and computerization that are pushing the boundaries of the field. They understand that for firms to be successful in today's rapidly changing marketplace, students also need to understand business and economic relations and be prepared to work in a flexible and adaptable work environment.

Within this area, at a more basic level, teachers are knowledgeable of software, integrated office systems, data management and computer applications for many purposes. Business, Marketing and Information Management also includes preparing students for administrative support roles across all industries. In the area of marketing, teachers understand that because of the growth in service industries, such as insurance, real estate, recreation and tourism, students are presented with an increasing variety of career options to pursue. Teachers are skilled at acquainting students with the core principles of customer service, product promotion, pricing and segmentation and market research for the fields listed above, and about the range of other jobs available in this sector, including fashion merchandising, financial services, general merchandising and hospitality marketing. Within accounting and finance, for example, teachers are knowledgeable of basic functions, such as auditing, cash flow analyses, investment and risk taking, banking, lending and capital formation and how they influence the behavior of both new enterprises as well as established firms.

In addition to these career specializations, teachers are knowledgeable of common themes which permeate each area within this sector, including business communications, financial concepts, human resource development, leadership development, business environment, economics of business, and functions of business throughout the world.

These teachers understand the special skills of entrepreneurship associated with starting, owning and managing one's own business, including those related to labor-management relations and the various interactions businesses have with government, such as tax and insurance regulations. As job security, longevity, retraining and advancement with one company is becoming less than the norm, and as consultants or part-time workers with specific skills are engaged to increase the flexibility and lower the overhead expenses of business firms, there are a growing number of individuals who are self-employed and need such skills. As in other industries, teachers stress the importance of flexibility of training and flexibility of mind, so that students are ready and able to shift careers and begin new challenges as the need arises.

Family and Consumer Sciences

Family and Consumer Sciences teachers prepare students for family life, work life and careers by providing opportunities for students to develop the knowledge, skills, attitudes and behaviors needed for: strengthening the well-being of individuals and families across the life span; becoming responsible citizens and leaders in family, community and work settings; promoting nutrition and wellness across the life span; managing resources to meet the material needs of individuals and families; balancing personal, home, family and work lives; using critical and creative skills to address issues in family, community and work environments; functioning effectively as providers and consumers of goods and services; and obtaining entry level positions in family and consumer sciences careers and other related careers.

Teachers of Family and Consumer Sciences prepare students to be productive members of society and lay the groundwork for students to pursue careers in such fields as child and elder care and in the clothing and hospitality industries. They develop students' capacities to raise children and manage their homes and their work life outside of

the home. Consequently, they are knowledgeable about child development; resource management; the use of environments; the design, use of and access to current and emerging technologies; nutrition and wellness; life planning and life-long learning; and communications. These teachers have the skills to critique, develop and implement policies that support individuals, families and communities.

Teachers of young adolescents focus on assisting students in understanding the development and use of personal, social and material resources to meet human needs. They work with them to begin to confront many of the decisions they will make over the course of their lives concerning careers, leisure, community involvement and personal and family relationships. Teachers of older adolescents may more directly focus on career paths in Family and Consumer Sciences, as well as on preparing students for the imminent responsibilities of managing work and family roles as dependable members of families and communities. The goals of Family and Consumer Sciences can be clustered into four areas: nutrition and wellness, family relationships and human development, clothing and textiles, and housing and environment. Across all these areas teachers bring a strong background in psychology, health and consumer economics.

Teachers of nutrition and wellness help students apply the concepts of nutrition to daily living and recognize the relationship between nutrition and wellness. Part of this process includes helping students to understand the principles involved in planning, purchasing and preparing food in a nutritionally and economically sound manner. These teachers know how to take advantage of technology and develop students' aesthetic sensibilities, while concurrently meeting the nutritional needs of different individuals and taking account of the economics of the food service industry. They also are knowledgeable about proper safety and sanitary procedures, the use and care of equipment and technology, and the techniques used in preparation and service of foods in various settings (domestic and commercial).

The focus in the family relationships and human development area is primarily on the growth and development of individuals and the family across the lifespan. These teachers are knowledgeable of the contemporary issues facing individuals and families. Of primary interest are the physical, social, intellectual and emotional characteristics of human development at every stage, and the material resources required to meet human needs. Teachers help students to understand the personal needs and priorities of individuals at various ages and stages of the life cycle. They help their students understand the role of communication skills, values and cultural differences on family and workplace interactions, and how to apply stress management and coping skills to conflict situations. They make students aware that dangerous personal behavior can lead to serious long term consequences (e.g., pregnancy and AIDS). They also teach students how to relate to and learn from adults and younger children.

Within the clothing and textiles area, teachers are knowledgeable about clothing as it is influenced by many factors. They prepare students in several key areas: cultural, aesthetic and historical aspects of clothing and textiles; clothing decisions, values and appearances; fibers, fabrics and design principles of construction; functional clothing; selection, care, repair and redesign of clothing; and careers in clothing and textiles. They help students use technology in understanding textiles and fabric and clothing production. These teachers are knowledgeable about conservation issues as well as the variety of opportunities in the apparel and textile industries.

And finally, in the housing and environment area, these teachers have a background in such topics as housing decision-making and technology, design theory, home living and maintenance, and interior and exterior management. This allows them to assist students in learning about suitable housing

options and about how one makes decisions about housing needs, including considerations of family needs and economic factors. In terms of design, teachers are knowledgeable about the historical, environmental and cultural influences on architecture, as well as specific considerations, such as structural and decorative design, line, shape, form, space, color, texture and lighting. They are aware of the resource considerations involved in housing decisions, including energy conservation procedures and new technology, techniques and procedures for maintaining home safety and maintenance.

Health Services

Health care reform is driving many changes in the industry, including new cost containment practices and a greater focus on preventive care and personal health responsibility that will lead to new job groupings and skill mixes. Cross training, the creation of broader job definitions, and continued technological advances are anticipated to be important factors as we move into the 21st century.

There are currently over 300 different health-related careers from which to choose requiring different levels of education. Exemplary teachers have knowledge of the different options, including the many careers related directly to patient care (e.g., nursing, psychiatry, rehabilitative therapy), as well as those tied to the infrastructure of health care systems (e.g., biotechnology, hospital administration and medical records).

These teachers are knowledgeable of the issues central to the health industry as well as the variety of career paths within it. In addition, they know the main ideas and themes that students need to understand about this field. Included here are the history of health care, health care delivery systems, human body systems, human development stages, the basics of diagnosis and first-aid, ethical and legal responsibilities, health care environment and safety issues, health care business practices, personal traits and health care planning, and patient contact skills. Because of the necessary focus on the body, health and disease and other biological systems, teachers in these fields have an increased depth of knowledge in science — particularly biology and physiology — as well as in health sciences.

In addition, these teachers are also aware of the rules and regulations set forth by health licensure and certification boards and agencies. These rules and regulations are intended to assure safe practice and, in turn, assure the safety of the practitioner and patient. They describe the scope of practice for individual practitioners, course content, and student-teacher ratios during lab practice and interning.

Human Services

As with business, human services is a large sector of the economy that has many facets in both the public and private sector, including education (preschool or day care, in particular), law and legal stud' 's (court clerks, paralegals), law enforcement (police officers, forensic technicians), public administration (community planning, public works), child and family services (foster care, family support systems), religion (youth counselor, family support systems), and social services. What unites these careers is the focus on direct service to individuals in the community.

Because the field is so heavily dependent on strong communication skills, these teachers are especially knowledgeable about communication theory and English language arts. They know in particular the kinds of interpersonal skills that are valuable for students to have to be successful in these fields, such as the need to be able to listen carefully and to respond authentically to the needs of others. They especially focus on helping students develop the skills needed to work with and understand individuals from a wide range of backgrounds and cultures, and on helping students understand that the kinds of communication

that work best in one setting may need to be modified substantially as circumstances change.

At a more specific level, they command a body of knowledge within a more narrow focus of the human services. For example, those working in education know about the development of young children, how to supervise and teach children in a variety of settings, the nutritional and other health needs of children, and about the roles and responsibilities that are placed upon those who work in day care centers, schools and other settings that provide services to children and their families.

Teachers also help students understand the legal and public policy issues that affect workers and clients in the public sector, such as the health and sanitation legislation affecting day-care centers and the current policy discussions relating to the rights of persons placed under arrest. They know how to nurture the leadership and self-direction that are critical in human services work — particularly important here because of the generally entrepreneurial nature of client-centered work. They are also well-versed on other essential core knowledge, including budgets, healthy and safe environments, psychology and sociology, basic economic concepts, consumer rights and responsibilities, conserving and managing resources, and basic office practices.

Manufacturing and Engineering Technology

Though economic trends point to a shift toward a service and information-based economy, the careers within this cluster will continue to account for a significant percentage of the job market in that they involve the design, manufacturing and maintenance of so many items important to our lives. Students prepared by vocational educators in this area will be those who build our homes, repair the plumbing, maintain and service our automobiles, and design and manufacture new products that may serve to make our lives easier. Within this framework, teachers are knowledgeable of the following career paths: engineering related technologies, mechanics and repair technology, manufacturing technology, and transportation, including the maintenance of transportation systems, energy technology, and built environment technology.

Teachers in this cluster are knowledgeable of scientific principles and skilled in mathematics; they understand and know the applications and implications of the latest technology. In order to assure their teaching keeps current with advancing technology they develop programs centered around skill and performance standards developed by industry specialty groups.

As job processes become more intervention-oriented, workers will need the skills to enter tasks or processes put in motion by others but maintained by new tools over which the worker has some degree of control. Workers more and more are functioning as part of teams, with roles and responsibilities changing as the work changes. Therefore, these teachers also have strong interpersonal and communications skills and know how to develop those skills in their students.

Each of the unique specialty areas within this cluster has a substantial knowledge base with its own tools and technologies, industry standards, and ways of inducting new employees into the workforce. All teachers within this cluster have a general knowledge of those standards and processes. They are knowledgeable of the general concepts that span this sector of the economy: for example, knowledge of new and emerging technologies and materials, processing and feedback control, outputs and robotics, understanding the role and function of tools and machines, entrepreneurship and economics, and computer skills — operations, interfacing, networking and controlling.

Within their own area of specialization, they are knowledgeable of specific industry standards, tools and methodologies and know how to work with students who hope to enter these fields. For

example, within manufacturing technology, teachers know about the new methods of flexible production and about specific standards that encompass particular processes — fasteners, metal joining and safety; materials testing — stress and strain load and quality control; prototyping; service; maintenance and numerical analysis.

A second example of a specific knowledge base is the requirements that teachers of built-environment technology will command, such as knowledge of the building trades, including plumbing, electrical wiring, and carpentry; and grounding in related matters such as architecture, engineering, interior design, planning, housing policy and construction technology. Examples of the kind of skill standards these teachers would know include those for construction technology, involving planning and layout processes, material processing, assembling processes, cabinet making, work-site safety, masonry and insulation tolls.

Technology Education

While many vocational education teachers are engaged in moving students toward a particular career path, technology education teachers direct student learning to broad thinking about systems rather than to the development of work skills specific to a single industry. Like their counterparts in vocational education, they have an interest in interdisciplinary instruction to contextualize theory and extend industry knowledge beyond mere production. They are also knowledgeable about the techniques and tools that vocational educators bring to solving problems in a variety of industries. However, technology education teachers have their own distinct body of subject matter knowledge.

As technology can be defined as the use of knowledge, tools and skills to solve practical problems, technology education involves introducing students to the concepts behind how technological systems work; specifically, that systems involve inputs, processes and outputs. While there are myriad applications and variations, teachers are knowledgeable about systems clustered around four bases, which are communication systems, transportation systems, manufacturing systems and construction systems. Innovation happens quickly in technology. Therefore, teachers build their ever-expanding and revised knowledge on processes which, while improved by technology, essentially remain the same. In communication, the processes they know are the encoding, transmitting, receiving, decoding, storing and retrieving of information. In transportation, these include routing, loading, moving, unloading and storing of various goods. Manufacturing is seen as a system of locating material resources, extracting them, producing industrial materials and producing products. Construction technology is a system of preparing the site for building, setting foundations for the structure, erecting the structure, installing utilities where required and completing the site. Teachers know these systems and processes and guide students through lab-based learning experiences which allow them to both understand each system and work at a particular process. For example, rather than read about a fiber optics system, students will hook up to one, troubleshoot it, and, if necessary, make modifications to improve efficiency. These teachers know how to develop problems which promote student learning around each of the communication processes.

Across the four systems in which these teachers focus there are a large number of technological tools and processes. While technology education teachers would not be expected to be experts in the use of all of these tools — knowing Computer Assisted Design to the extent required of a manufacturing and engineering teacher, for example — they should be familiar enough with the general operations of such tools to introduce students to the general principles

behind their use and how they operate in the systems that are being studied.

These teachers know the roles and responsibilities of workers at different stages in these systems, the problems which frequently arise, and innovations that have been designed over time to make systems operate more efficiently. For example, they know about the "Just-in-Time" philosophy of parts distribution (a solution to massive storage requirements) and about management principles designed to address problems of job stratification and worker alienation.

Within each of the four major technological systems, teachers know the history, development and major achievements of various industries, the types of equipment in use, as well as the career paths that are available to students and the training needed at various levels. For example, in communication technology they understand the functioning of satellite uplinks and downlinks, broadcast technology, laser/fiber optic communication systems, print and computer graphics and the social consequences of these new technologies both domestically and internationally. In order to direct students toward future training they keep abreast of work opportunities in the broadcasting industry, in graphic arts and in telecommunications.

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Standard III: Learning Environment

Accomplished vocational teachers efficiently manage their classrooms and create an environment that fosters democratic values, risk taking and a love of learning. In this environment students develop knowledge, skills and confidence through contextualized learning activities, independent and collaborative laboratory work, and simulated workplace experiences.

Supportive, collaborative learning environments where students are intellectually challenged and develop new knowledge, skills and confidence are the result of the skill and hard work of accomplished teachers. To create environments where students feel they are valued and respected members of the learning community, teachers cultivate student interests, value the unique perspectives each brings to class, and press students to devise and solve problems both individually and collectively. They value risk taking and learning that emerges from errors of judgment, confusion or the challenge of addressing complex problems, and encourage students to recognize that successes and setbacks are both part of the processes of invention, discovery and creation.

Contextualizing Learning Environments

Because of its very nature vocational education is centered around activities and application, teachers create highly collaborative and cooperative classroom cultures, centered on problem solving and investigation. As authentically as possible, teachers carefully organize their classrooms around the principles of high performance workplaces. For example, in a class presentation structured around the development of an electric vehicle or student-run farm, students work together problem solving, inventing and creating the product at hand and focusing on how to most effectively and efficiently address authentic workplace dilemmas. Even when the activity takes place in the context of a meister-apprentice relationship — with students working directly alongside a master craftsperson — students work collaboratively and cooperatively, taking on more responsibility as they gain new knowledge and skills.

Teachers in a meister-apprentice relationship manifest high standards of conduct. In order to honor the work and uphold the spirit of cooperation and invention, teachers create an environment that values fairness, recognizes and rewards quality work, and offers constructive criticism which directs students toward growth and improvement of skills. Such teachers push students to apply their knowledge from project to project, and not merely soak up and store away new knowledge with each new task.

The learning-lab environment is a trademark of vocational education, and is driven by the desire to both engage students and encourage mastery of learning. Teachers believe it is their responsibility to develop all aspects of students, including their academic, vocational, social and ethical selves (see also, Standard V: Workplace Readiness and Standard VI: Managing and Balancing Multiple Life Roles). The classroom environment is designed specifically to tap all these areas, and teachers cultivate them neither through happenstance nor driven by the demands of production, but instead by aligning instruction with their knowledge of the ways students learn best — in context, actively involved and engaged, both hands and minds — in relevant and meaningful tasks. They tap students' perceptions of what is real and relevant at the moment and of pertinence to their futures — a message that places high value on student initiative and creativity.

Beyond engaging students, contextualized learning experiences are central to student mastery of specific content. The key aspects of successful contextual learning can be developed in a number of possible settings — classroom simulations, labs, or work-based learning experiences beyond the traditional classrooms (e.g., on-the-job training, apprenticeship, clinical internships or service-learning opportunities). Teachers are adept at using these different activities to create an environment where students can demonstrate mastery of new skills and knowledge. Embedded within such learning activities are opportunities to empower students through decision-making, interdisciplinary collaboration and teamwork, leadership, problem solving and negotiation. Work patterns of this nature create a classroom environment that mirrors those found in high performance workplaces.

Managing Classrooms Efficiently

The learning environment described above can only flourish in a well-managed classroom. Central to the establishment of such classrooms is an environment of intellectual and physical safety and one where students feel respected by all as individuals. By modeling and communicating clear expectations of classroom policy, teachers promote the open sharing of ideas and initiative taking. In such classrooms, the sense of community is forged through the validation of positive, constructive behavior. When dealing with disruption, they do so expeditiously and fairly and in ways that do not create a continual focus on disruptive behavior.

Central to good teamwork is careful attention to counterproductive work. Teachers manage to filter out the unimportant actions and reduce disruptions and are skilled at distinguishing between exuberance and misbehavior. When they have to reprimand a student about misconduct they do so constructively, getting to the root of the problem or issue in a timely manner.

The establishment and maintenance of a productive learning environment results from the careful blending of attention to individual student needs with focusing on the goals of the entire class. Lessons flow from the balance of competing and complementary interests, as teachers skillfully juggle the needs of all students to obtain a high level of engagement. These teachers are skilled at anticipating difficulties that students may encounter which may serve to disrupt the classroom flow or the collective sense of purpose, enthusiasm and engagement. This is no small accomplishment considering students may be engaged at many different levels — individually, co-operatively in groups or on a whole class project. Teachers model team building and collaborative behavior in a variety of ways, including through their interaction with students and the alliances they establish with other teachers within the school program, and with educators and citizens in the larger learning community.

Maintaining Safety

When it comes to safety, teachers run a tight ship. Vocational classrooms and work sites are often filled with potentially dangerous equipment and machinery, so securing student safety is a primary concern in the creation of an environment conducive to learning. Teachers make students well aware of safety regulations and laws both in school and at work sites. They understand that mishandling equipment cannot only lead to personal harm but, if equipment is rendered inoperable, the loss to other students of potentially valuable learning experiences and to the school or workplace the loss of financial resources as well. Students come to understand that the lab and work environment are places for concentration and attention to detail.

Creating a Democratic Environment

Rather than being the sole source of authority or expertise, teachers are receptive to student ideas and interests. To do so requires they be as attentive to the process of education as they are to student mastery of discrete skills. Teachers are particularly interested in promoting the values of fairness, tolerance and community. One way they accomplish this, in addition to valuing student comments and concerns, is by involving them in the negotiation of classroom rules, routines and behaviors as is done in high performance workplaces. Such involvement on the part of students is an important component in the development of student leadership and teamwork skills and is another way teachers actively engage students in the classroom. Teachers are also aware that students may bring attitudes with them to the classroom that run counter to the kinds of democratic values they seek to instill in their students. They confront such attitudes and model alternative behaviors and frames of mind which will serve students in their future employment. Through participation in rule setting and classroom functioning students learn firsthand about individual differences and preferences and therefore increase their awareness of the needs of others. Using the above described techniques as well as others, these teachers also demonstrate skill in bringing students with exceptional needs into the mainstream of classroom life. This attention to democratic values and classroom processes and procedures allows teachers another opportunity to use the diversity of the class as a strength.

Encouraging Love of Learning, Invention and Risk Taking

Teachers also work to establish a culture of inquisitiveness and exploration. They model and carefully nurture the interests of all students. They are passionate and enthusiastic about their field, and driven by a love of learning for learning's sake. But their infectious enthusiasm is not limited to expertise in their field. In general, they are intellectually adventurous and more than willing to share their discoveries in many areas with their students.

Teachers continually push themselves and their students to do their best and to be persistent about getting the job done. This work ethic extends from their desire to continually improve and perfect their craft, to their can-do attitude with all students, through their outlook on both classroom and student problems. At heart, they are problem solvers and are not easily dissuaded from doing what is best for students.

Modeling a love of learning is not necessarily sufficient to develop the same behaviors in their students, however. In addition to the enthusiasm they display about their own learning, they cultivate enthusiasm and pride in students' discoveries. They select projects that evolve and unfold — that begin with student interest and eventually take on more student direction. Rather than directing student work with step-by-step instruction, they create flexible assignments that encourage student creativity and problem solving. As students grow and have success in their work, teachers allow them to take on projects themselves, decreasing their direct teaching as they become coaches from the sidelines. Teachers foster student empowerment by validating independent thinking, encouraging inquisitiveness and celebrating competence.

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Advancing Student Learning

Even with an extensive knowledge base about human growth and development, subject matter, and the creation of productive learning environments, the best intentions can crumble without the ability to put such knowledge into practice. The next five standards describe the joining of teachers' knowledge about students, subject matter and pedagogy with professional judgment. Included here are the ways teachers use an extensive repertoire to encourage student mastery of knowledge, development of workplace readiness, management of multiple life roles and the development of social competence. Also included in this section are the ways teachers encourage student success through assessment practices.

Standard IV: Advancing Knowledge of Vocational Subject Matter

Accomplished vocational teachers foster experiential and performance-based student learning of vocational subject matter by creating important, engaging activities for students that draw upon an extensive repertoire of methods, strategies and resources. Their practice is also marked by their ability to productively integrate vocational and academic disciplines.

Whether teachers are focused on general or specific industry knowledge, they do so within a classroom of invention and production that demands an extensive repertoire in experiential learning. Often referred to as contextualized learning, many strategies both real and simulated, within and outside the classroom, are used by exemplary teachers. These strategies include work-based learning, clinical internships, apprenticeships, cooperative education, entrepreneurship, school-based enterprises, the use of performance-based evaluation, and project or product-based learning.

Teachers design instruction to engage students in wrestling with and gaining command of important ideas, concepts, theories, facts and skills as opposed to just memorizing discrete facts and procedures. The teaching of theory in addition to production skills is also included, creating a marriage of both hand and mind learning. Classrooms that fit this conception authentically mirror activities, projects, problems or jobs in the world beyond the classroom.

Embedded within classroom activities are the knowledge, skills and abilities that are essential to success in the adult world. Teachers use these activities in a variety of ways, matching the appropriate developmental level of their students with opportunities to extend the classroom outside the school. One purpose of such projects and activities is to ensure students gain exposure to and competence within a career area.

Creating Engaging Learning Activities that Enhance Student Mastery of Knowledge

Teachers draw upon their repertoire of knowledge of the disciplines and vocational content and skills to create learning activities aligned with their goals for students. They design programs and activities that integrate academic and vocational content and that help students come to grips with the key issues, concepts, competencies and skills necessary for work in a specific industry and for employment in general. Teachers take care to ensure their work meshes with industry standards, current issues in the field and themes central to the industry structure within which they are

practicing. They help students understand how to see their field through many lenses.

Because the workplace often presents challenges that cut across arbitrary boundaries, teachers often devise activities that draw on multiple disciplines in addition to vocational content. They design projects that help students understand the potential breadth of tasks within a field, to practice and develop the kinds of academic skills that might be brought to a given job, and to develop some of the specific skills and techniques that are used to solve problems within a given industry. Accomplished teachers are able to see and understand the needs and demands of a whole project. Often, projects are broken down into their constituent parts so that students are better able to understand the theoretical constructs which undergird them.

Teachers integrate vocational and academic content, both horizontally across several academic disciplines, as well as vertically, throughout the high school curriculum and beyond. They understand the purpose of integration is not just to broaden vocational projects for the sake of breadth alone, but to mirror the blending of disciplines as they are found in the world around them. To accomplish this, they may create projects or activities such as school-based enterprises, that naturally require students to draw on knowledge and skills of many disciplines. Or they may collaborate with colleagues in other departments to intentionally design a multi-disciplinary activity. In both instances they purposefully target specific vocational and academic understandings that students need to develop.

Teachers design and implement projects which provide students opportunities for problem solving and assist them in developing the critical habits of mind that allow them to make sense of what they are learning and how it relates to the bigger picture of the industry or system they are studying. They expose students to a variety of techniques for negotiating an activity or project, for example, orchestrating the class around a series of key questions such as the following: 1. What literature is available that can help me? 2. What expertise can I draw upon? 3. What is potentially dangerous? 4. What resources do I have and how shall I use them? 5. What are the potential gains, losses and risks of a given course of action? Classroom environments characterized by discovery and invention introduce the notion of uncertainty and provide opportunities for students to test unfamiliar waters and think independently in the absence of strict directives. Such settings allow teachers to encourage students to take measured risks when the path to solving a problem is unclear, and to experience failure and learn how to recover. In these classrooms directly confronting uncertainty and chaos is an equally important component of learning as success itself.

Teachers work collaboratively to establish work site learning activities or internships, ensure supervision of students in these situations, and know how to ensure that quality learning is going on when students are off-site. They seek to structure such experiences in collaboration with a work site mentor around explicit objectives, training plans and assessment processes.

Guiding Students in the Acquisition of Knowledge

Designing the appropriate project, activity or exercise is the necessary first step toward mastery of competency. Skillful execution must follow. The coaching, or step by step process of bringing students into the work, is a complex enterprise given that each student places different demands on the structure and character of the coaching. It requires teachers to carefully diagnose current student skill levels in the work process, help and support students when necessary, and gradually remove support structures as students learn to manage on their own. Whereas some students may need help simply in conceptualizing a possible topic, scope or sequence, others may demand greater

assistance before taking the next step. Still others may begin quite vigorously and confidently, rejecting assistance until the very end. Teachers are astute at understanding the type of support each student needs and acting effectively on these judgments to design tasks appropriate to the work of the students in each class. In all cases, the emphasis is on advancing student performance.

Contextualized learning activities are useful because they create a meister-apprentice relationship. Beyond ensuring student mastery of vocational content, teachers take advantage of this relationship through attention to three key debriefing activities. First, they carefully debrief all activities by helping students identify what precisely has been learned, helping students understand and appreciate both the final outcome as well as the knowledge and skills they have developed and demonstrated in the process. Second, they help students reflect on their own thinking to illuminate and then analyze their problem-solving strategies. They skillfully lead students in this analysis, which includes questions such as the following: 1. What did you do and why? 2. What risks did you take and to what purpose? 3. What could you do differently next time?

Third, teachers help students understand their personal learning processes. Through this exercise, students become cognizant of their strengths and weaknesses and how to apply this knowledge in new learning situations.

Ultimately, students learn to use their minds well in addition to obtaining concrete production skills. Through attention and awareness to these three areas, students develop an ability to create a presence in their work: an awareness of their performance and how it fits into the larger system.

Utilizing a Variety of Materials and Resources

To create an engaging environment and meet the needs of a diverse clientele, teachers take into account several factors in their decision-making. Among these are the selection and adaptation of materials that reflect what they know about the way students learn best. They are careful to select, adapt or create only those materials that meet specified criteria and standards for quality. Quite often this entails extending the classroom into the community, where teachers judiciously select from an abundant array of resources to enhance student learning. When community resources are sparse, teachers create a rich classroom environment that simulates the world of work.

They are equally skilled at garnering and developing resources from and within the community at large and within the school itself. Because the ultimate goal of a vocational classroom is to bring the outside world in, teachers make use of a wide range of resources from many different sources to create an engaging learning experience. They develop a resource base representing multiple mediums: written examples, electronic media, and current and historical samples from the workplace. With a broad assortment of teaching aids, they increase student understanding of the lesson at hand, as well as their ability to think comprehensively about their work. Among their resources is also a broad representation of form, style, gender appeal and awareness, cultural background and level of difficulty. When teachers find themselves in situations of meager resources or limited funds, they are noteworthy for their resourcefulness in locating the necessary ingredients for quality instruction, including the development of student-run enterprises or service-learning activities.

Teachers are astute in using a range of resources, because in doing so they provide students with multiple avenues to understanding, thus increasing the likelihood that students will grasp the important ideas, concepts and skills they are attempting to impart. They make judicious use of current high quality technologies in order to ensure students are adequately prepared for the changing world. Although such technology may change rapidly, teachers are up to date on the range of resources

specific to their industry area. When it is not possible to provide new, up-to-date equipment for the in-school laboratory, teachers stay abreast of the changes and seek alternate ways for students to learn and understand modern technology first hand.

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Standard V: Workplace Readiness

Accomplished teachers develop student career decision-making and employability skills by creating opportunities for students to gain understanding of workplace cultures and expectations.

Teachers know that while advancing student understanding of the particulars of specific industries is important, this alone is not sufficient without an understanding of workplace culture and expectations and the development of employability skills. They also ensure students can apply this knowledge to their own career decision-making.

Helping Students with Career Decision-Making

Experiences in simulated or real workplace environments are significant for their role in providing perspective for students' career decision-making. Teachers understand that student decision-making rests on a host of factors, including experience and exposure, family aspirations, peer views and student perceptions of their own talents. They therefore create class laboratory activities and processes to illustrate certain aspects of work associated with particular career choices and take time to guide students in decision-making toward promising paths in their field of interest. For example, as part of helping students create a school-wide health fair, a teacher might bring in staff from a hospital personnel department to expose students to the range of jobs available in the facility. Teachers encourage students to think expansively about the range of possibilities that lie before them and identify career paths that are best suited to their interests.

In addition to creating opportunities for career exposure and development, teachers take responsibility to guide students in their decision-making processes. While experience alone can teach students about their likes, dislikes, skills and abilities, teachers can help students sort out these experiences. As instructional guides and mentors, teachers help students to think deeply and purposefully, enabling them to make sound decisions about the steps they might take following high school. Along with exposing students to the options before them, they might also provide the opportunity for students to read further about their field of interest, to meet with experienced workers in particular industries to talk about the advantages and disadvantages of pursuing a particular career path, or to have discussions with their peers about the decisions they all face. These decisions are often influenced by the cultural norms and mores of the family, the community and peers, which can limit the choices students perceive are available to them and worthwhile. Consequently, teachers recognize their obligation to help their students navigate this uncertain terrain. In doing so they make them aware of the steps they can take to maintain some degree of flexibility in their careers and ensure that students avoid settling for a narrow set of false choices.

Developing Employability Skills

Teachers know that in addition to an extensive industry specific knowledge base, employers often place great stock in generic workplace skills and dispositions. The dispositions that teachers develop are given more attention in Standard VII — Social Development. In addition to those attitudes, teachers design classroom activities that help students

develop a strong work and personal ethic that includes learning how to plan for success and how to avoid problems by taking responsibility for one's own tasks and assignments. They teach students how to work effectively with co-workers and clients from diverse backgrounds and ability levels different from their own. They also create opportunities for students to develop the ability to teach others new skills, to satisfy customer or client expectations and to work with their peers to settle disputes born of honest differences of the sort that might emerge in the workplace.

Related to skill in problem solving is the ability to organize, plan and allocate resources. Skill in workplace resource management and utilization is necessary in four key areas: time, money, material and facilities, and human resources. Students are challenged to manage and allocate resources most efficiently in all classroom projects and activities. Teachers also develop systems knowledge in students, ensuring that students understand how social, organizational, and technological systems work, operate effectively and are interrelated. Working with students to understand resource management and systems processes provides teachers another opportunity to hone students' thinking skills.

Understanding Workplace Culture and Expectations

Central to development of skill and knowledge in the workplace is the creation of simulations of workplace settings, or placement in these environments so students may experience the culture and expectations firsthand. Equally important, however, is the creation of exercises and activities that have embedded within them the processes, quality methods, tools and expectations, standards and practices demanded in high performance workplaces. For example, students need to know the norms of dress in most office environments and the expectations for customer service and quality control. Teachers construct classroom lessons and design of work-based learning opportunities that provide opportunities for students to learn about high performance workplace standards and current industry practice, such as total quality management production techniques. Students work in teams designing and executing original creations, enterprises or services, rather than mimicking processes conceived and directed by others. Through first-hand experience in the workplace culture, students come to appreciate the demands of the workplace, including the need for direct communication between on-line workers about problems and the need to be individually responsible for one's own assigned duty. Thus, on-line tasks, dilemmas, challenges and opportunities are addressed directly in their real-life context. Students become reflective and gain a critical perspective on important industry issues that allow them to anticipate issues, and continually seek better ways to create and deliver products and services. Teachers design projects to stretch student knowledge, to engender perseverance and risk taking, and to encourage them to take on more responsibility for honing skills.

Surrounding all workplaces there are issues related to the conditions of employment, including the presence or absence of organized labor, safety, fringe benefits, the structure of work and the competitive environment. Through simulations, class discussions about actual workplace experiences and other such methods teachers help students develop an understanding of workplace rights and such matters as health care policies and procedures, workmen's compensation plans, and government policies which affect such matters. They help students learn how to address employers about illegal or harmful workplace practices and other issues that directly affect the safety and rights of themselves and others. They are also astute at helping students understand the complexity surrounding the more subtle issues of sexual harassment or discrimination.

A last important employee skill in which teachers help students develop capacity is the ability to quickly read the workplace environment and understand its norms and expectations. Their students learn how to balance their expectations with the reality of the workplace environment; how to balance their initiative and responsibility with the existing leadership and decision-making structure of the workplace. They help students navigate the not-so-hidden agenda or subtext that governs the workplace environment: to know when to take initiative and when to step back, when and if to seek alternative ways of airing their concerns. Such ability increases the chances that a new worker will be able to enter a work environment and make judgments about whether it is a culture that is congenial and, if not, whether to leave or make accommodations.

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Standard VI:
Managing and Balancing Multiple Life Roles

Accomplished teachers develop in students an understanding of the competing demands and responsibilities that are part of the world of work, and guide students as they begin to balance those roles in their own lives.

Teachers balance specific industry knowledge, workplace know-how and specific employability skills with a broader understanding of the life roles that students will assume beyond the world of work. They understand that students must make choices about a variety of roles in their lives, from the relationships within their families and with peers, to more structured relationships in the community and with employers. They work with students as they manage these roles and responsibilities.

Balancing Life Roles

Teachers understand that as adults, students must balance competing responsibilities and obligations, and this includes understanding and making decisions about just which responsibilities they will undertake and when they will undertake them. Decisions facing students in their near or immediate futures include whether to marry and have a family, how much responsibility to assume for older family members, and how actively they wish to be involved in their communities. Teachers know that it is useful for students to have available a range of strategies for making decisions, and include in their curriculum discussion of such issues and examples of a variety of strategies students may find useful. They also know that regardless of the choices that are eventually made, challenges will appear. They help students begin to prepare for these challenges by starting to think through their own mechanisms for coping with them.

They also teach students to recognize that balance is necessary when their chosen roles come into conflict with their work responsibilities and that trade-offs are often necessary. For example, the demands of family life, while rewarding, can sometimes overwhelm and threaten performance at work or vice versa. They discuss with students such dilemmas and consider with them a range of strategies which might be useful in dealing with the unpredictability of life, including family life. They are also realistic, helping students understand that often there are no easy answers, that priorities and values may conflict, and that the available choices may seem limiting and unfair.

As part of the management of these multiple responsibilities, teachers help students recognize the importance of understanding the cultural and social norms of the workplace and adapting their language and behavior to that which is most appropriate for the given situation. Where necessary, they help model the appearance and the kind of language and behavior that will best serve students in their chosen line of work. They recognize that outside mentors can also serve as models for appropriate behavior and can communicate the importance of being able to shift from what is acceptable community language and behavior to that of the workplace.

Understanding Personal Economics and Managing Daily Life

In addition to balancing many life roles and learning how to behave in different situations, teachers also prepare students to manage their personal financial affairs successfully. They help students understand how to be good consumers and deci-

sion-makers about products and services. Beyond decision-making, they help students learn how to manage and balance their finances with their obligations and needs. They discuss with students when to save and when to spend and how to plan for disaster or unforeseen circumstances (e.g., considering with students how to balance career decision-making with family needs when a career changes or when additional education would adversely impact family finances).

Preparing for Community Involvement

Many students will find involvement in their communities an important part of their lives, and teachers help them understand how to be contributing members of a community. This can occur in a variety of ways, including having students participate in local political organizations, social clubs, religious groups or community action organizations. Teachers often encourage students to volunteer in door-to-door canvassing, letter writing, fund raising or community clean-up activities. The goal is to provide opportunities where students can discover that they can make a difference in the quality of their own lives, their families and others in the community.

Teachers also encourage participation in democratic institutions. They make sure students understand the fundamental democratic rights, responsibilities and processes that are part of being a U.S. citizen, and encourage debate, conversation and careful consideration of issues in the development of an informed stance.

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Standard VII: Social Development

Accomplished vocational teachers develop in students self-awareness and confidence, character, leadership and sound personal, social and civic values and ethics.

Because highly accomplished vocational teachers are dedicated to preparing students for adulthood, their interest in student development extends beyond the cognitive domain to issues of social development. Teachers recognize that students are seeking independence from their families at the same time they are developing ties to adults in the workplaces they are in the process of joining. To ease this transition, teachers demonstrate what it means to think and act as a caring and ethical human being and work with students to this end.

Fostering Development of Students' Self-Awareness, Confidence and Character

Although the key mission of many schools is to impart academic knowledge, teachers know that developing the social and emotional side of students is also critical to their futures. Teachers observe, cultivate and assess the social development of their students, noting their classroom comfort, relationships with friends, sense of belonging, character, integrity and concern for others. Through frequent interactions, they learn of their students' concerns and aspirations, and determine if and when students need advice and guidance. Based on these observations, teachers offer students encouragement and direction in learning how to better communicate ideas and feelings directly in ways that create self-respect and convey respect for others. They help students move from concern about themselves to an awareness of the needs, views and rights of others.

Teachers are concerned with development of tolerance and integrity in their students and conduct their classes in a manner that encourages respect for individual differences, be they related to skills, culture, gender, ethnicity, language diversity, disability or other factors. They employ specific strategies that extend learning to all students. For example, they develop project-based activities that require cooperation and provide opportunities for students of differing backgrounds and abilities to work together toward common goals.

Equally important to the development of these qualities is the opportunity to develop personal knowledge — an awareness of talents, skills, abilities, preferences and other perspectives — coupled with a sense of confidence about these attributes. Teachers use diverse strategies to enable students to better see themselves and the consequences of their actions. They understand that self confidence comes from the development of skill and competence. They hold high expectations for all students and demand hard work to ensure achievement of such expectations. They are careful to model perseverance, self-direction and dedication to work, and make sure students understand how much they appreciate student accomplishments.

Development of Student Initiative and Teamwork Skills

Teachers create a variety of opportunities for students to take action, assume responsibility, exercise leadership and develop initiative. They do this in many ways, such as service organizations, community participation, political action, honor societies and school organizations. Vocational student

organizations are one important example of structures that develop initiative and teamwork in students. Like other teacher-generated activities, vocational student organizations create a forum for the development of leadership and teamwork skills and provide a place to showcase student work in particular vocational fields. In many curricular areas students learn to plan, manage and direct activities through their participation in such organizations which contributes to the development of oral discourse, knowledge of democratic processes, and facility in committee work. Through such activities students become attuned to the expectations and preferences of different workplace cultures.

Encouraging the Development of Sound Social, Personal and Civic Ethics

Teachers foster civic and social responsibility in their students by providing them with opportunities or joint decision-making through participation in the leadership and governance of the classroom. In fact, the connections students see and experience between schoolwork and the larger community help them understand and apply principles of justice, freedom and liberty. Exemplary teachers design assignments that allow students to apply such knowledge to diverse events, themes, topics and situations that lead students to confront academic and civic dilemmas simultaneously.

Well-rounded workers and citizens also have well-developed ethical perspectives and habits of personal responsibility and concern for others. Teachers seek ways of instilling in their students character traits such as punctuality, honesty, fairness and tolerance that will serve them well not only in their work but throughout their lives. Through their daily lessons and in conversations with students, teachers work to build positive and caring relationships with and among them and thereby model the kind of communities they hope their students will become a part of and perpetuate. Teachers also encourage such students to broaden their perspectives by taking part in other arenas of life such as community service or other forms of civic involvement.

Teachers know that in most settings workers are confronted with ethical dilemmas, such as co-workers who steal or employers who use substandard materials or construction practices. Teachers help students understand the kinds of ethical decisions they may be called upon to make and provide them with opportunities to practice making sound judgments.

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Standard VIII: Assessment

Accomplished vocational teachers utilize a variety of assessment methods to obtain useful information about student learning and development, to assist students in reflecting on their own progress and to refine their teaching.

Assessment serves several critical purposes and is integral to creating a student-centered and performance-based classroom. Exemplary teachers use assessment to determine individual student progress, and to guide decision-making about the effectiveness of teaching strategies for the class as a whole. This often requires teachers to develop their own tools for assessment to ensure a good fit between the assessment tool and the goals they have set for their students. Teachers also place great stock in students learning to assess and monitor their own progress.

Assessment for a Variety of Purposes

The ultimate purpose of assessment is to gain perspective on student learning as it relates to the goals of vocational education. Teachers use informal assessment, monitoring student work on a regular basis to encourage student initiative, responsibility and ownership of a project as the meister-apprentice relationship evolves. As instruction moves forward, teachers adjust student assignments and work based on information gleaned from assessments. On a more formal basis, assessment is used as an analytic tool for students. Teachers help students to consider results critically: dissecting them to understand the theoretical constructs, discrete skills, problem solving processes and preferred learning styles of each student. Assessment is also used to gauge long-term progress within a class, as well as a student's entire high school career in relation to external benchmarks such as industry-driven standards and skills. Through the use of portfolios, for example, teachers help students select meaningful work that illustrates their growing accomplishments, knowledge, skills and interests.

Utilizing a Variety of Assessment Methods

Teachers are knowledgeable about a broad array of assessment methods and issues from which they select approaches that are well matched to their instructional goals and purposes. Furthermore, they know that the range of important objectives they have and student skills and understandings they seek to gauge usually cannot be captured with a single assessment, and that tracking student progress requires frequent sampling of student work and thinking. Recognizing the limits of standardized tests, teachers are adept at utilizing other methodologies, such as portfolios, videotapes, demonstrations, exhibitions and work-based assessments. These methodologies provide teachers and their students a variety of means to consider their accomplishments, uncover misunderstandings, and identify concepts and skills needing further attention. Teachers are also knowledgeable about industry and workplace standards appropriate to their area of expertise, including national skills standards and industry certification and licensure standards, and build their assessment tools and methodologies around them. Teachers are able to articulate the unique strengths and weaknesses of different assessment vehicles and communicate findings well to students and their families.

Helping Students Understand their Progress

Beyond its utility in helping teachers understand their own performance, one of the many purposes of assessment is helping students understand their progress. Collections of work samples in portfolios, resumes and weekly journal entries are examples of some of the methodologies that are useful in helping students reflect on their own work. Guiding students to an awareness of their own learning begins at the point student work begins, as teachers make sure students understand from the beginning what the goals and standards of the work are and what is expected of them. Increasing student awareness of goals and expectations against a variety of benchmarks, including personal, workplace and school, is an initial, but critical, step in developing the habits of mind for continuous reflection and assessment of progress.

Teachers use a variety of methods to help students become adept at assessing themselves in various situations. Ultimately, the purpose of students becoming self assessors is to help them understand the application of knowledge, as well as increase their self-awareness and confidence, document their level of skill, and aid decision-making about further education and career choices.

Assessment as an Opportunity for Feedback

In addition to informing teacher decision making and the development of student skill in self-assessment, teachers view assessment as an opportunity to validate risk taking, invention and learning from experiments that may not go according to plan. They understand the role teacher and employer feedback can play for students in initiating self-reflection, setting a course of action for improvement, and documenting progress for parents and other interested stakeholders. In addition, they understand constructive feedback is an important opportunity to communicate to students attitudes that foster an effective learning environment: regard for their students, a genuine desire to help them do well, and a collaborative spirit of teamwork.

Assessment and feedback responsibilities extend to student workplace activities as well. Although teachers do not always have opportunities for involvement in workplace activities, when they do, they take care to work collaboratively with employers to ensure quality experiences for students. Because assessment is central to these experiences, teachers educate employers on how to assess students. Wherever possible they assist employers in the assessment of students. For example, after a placement or internship has been negotiated, teachers will often write a job description in collaboration with employers. The description might be divided into observable components. Students' competence is assessed at the start of the placement to establish an initial level, and then used as a benchmark throughout the internship or co-op placement. Through such mechanisms, students are more likely to receive feedback from employers in a manner which illuminates progress and competence.

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Professional Development and Outreach

Remaining an exemplary teacher requires continual attention to one's practice. Teachers who are not steadily working to refine their practice find themselves frozen in their careers, standing still, or worse, losing ground in their profession. Additionally, such teachers regularly work collaboratively with families, colleagues and others to ensure the continued quality and effectiveness of their programs. The four standards that follow describe the ways in which exemplary teachers engage in regular activities within and beyond the classroom walls to strengthen their practice.

Standard IX: Reflective Practice

Accomplished vocational teachers regularly analyze, evaluate and strengthen the effectiveness and quality of their practice through life-long learning.

Accomplished teachers consider reflection on their practice central to their responsibilities as professionals. They are continually extending their knowledge, perfecting their technique, and refining their philosophy of education. They regularly examine their own strengths and weaknesses and employ that knowledge in their planning. They analyze the relative merits of both older and newer pedagogical approaches and judge their appropriateness for their own particular circumstances.

Teachers regularly engage in the process of professional growth and development. They are motivated by the rapid change they see around them (in the workplace, in technology and in the research literature) and by the desire to equip students for an evolving future. In their quest for self-renewal, teachers follow several paths which often include interacting with other professionals, exploring new resources, attending professional conferences and workshops, studying the professional literature, returning to business and industry and participating in advanced education programs. Such teachers distinguish themselves by their capacity for ongoing, dispassionate self-examination, their openness to innovation, their willingness to experiment with new pedagogical approaches, and their readiness to change in order to strengthen their teaching.

Evaluating Results and Seeking Input Systematically from a Variety of Sources

In their efforts to gain insight about their practice, teachers will often hold conversations with students and employers about the quality, climate and interactions in their class. They also carefully analyze input received from formal and informal conferences with families, guardians, students and others. These observations and discussions are carefully weighed by teachers as they reflect on their planning, monitoring, assessment and instructional techniques.

For accomplished teachers every class and every activity provides an opportunity for reflection and improvement. In the same way they encourage students to reflect and debrief after project work, teachers also consider the result of their actions. When things go well, they think about why the class succeeded and how to adapt the lessons learned to other classes. When things go poorly, they reflect on how to avoid such mishaps in the future. The review of work in progress and final student products are opportunities for teachers to assess themselves as well.

Teachers seek advice from colleagues through discussions, in-class observation of their own teaching, and personal observation of others' practice on

a regular basis. These observations and discussions and other discoveries from workshops and research shape their decisions about if, when and how practice should change. This examination also creates a predisposition to abandon less effective practices and replace them with more promising approaches. Teachers eagerly share their ideas with colleagues, serving as "critical friends," and they test and refine their evolving approaches to instruction.

Reflecting On One's Own Point of View

Teachers consider the effects of their own cultural background, biases, values and personal experiences on their practice. They are alert to their own philosophical filters, and take these into account when dealing with students whose background, beliefs or values may be importantly different from their own. They seek to treat each student fairly by working carefully through such conflicts. They understand they will be most effective with students by modeling the behavior they advocate. Hence they become attuned to the ways their own beliefs and behaviors influence their practice for better or worse.

Continually Refining Practice Through Study and Self-Examination

Teachers stay abreast of current research, trends and information by reading professional and technical journals, actively participating in related professional organizations and inservice workshops, completing graduate coursework, observing master teachers, and collaborating with colleagues and other professionals. Where appropriate they apply these lessons to their classrooms.

They keep abreast of significant developments, new findings, and debates in their field, aware that such efforts are essential in the rapidly changing worlds of business and industry. Through their industry, work-based and other community contacts, they keep up with prevailing trends, new technologies and processes. They adapt their practice as needed to account for such developments. They understand that some workplace changes are controversial and have well-considered positions on such issues. Such teachers have cogent reasons for what they do and can explain those reasons clearly to students, parents, guardians, colleagues, administrators, school board members and guidance counselors.

Teachers take responsibility for their own professional growth and development. They explore topics in which they may have limited expertise and experiment with alternative materials, approaches and instructional strategies. This personal study provides support for the instructional decisions they make and for their ability to articulate a rationale for their actions. It also contributes to their consistent ability to aggressively seek solutions to difficult problems they encounter.

Exemplary teachers participate in a wide range of reflective practices. They might keep a journal of how their own personal biases affect their teaching or conduct action research in their classrooms. They might collaborate with education researchers or other colleagues to critically examine their practice. Such reflection reinforces their creativity, stimulates their personal growth, tests new ideas and enhances their professionalism. They are models of the educated individual, regularly sharpening their judgment, expanding their repertoire of teaching methods and deepening their knowledge base. They exemplify high ethical ideals and embrace the highest professional standards in assessing their practice. Ultimately, self-reflection contributes to teachers' depth of knowledge and skill and adds dignity to their practice.

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Standard X: Collaborative Partnerships

Accomplished vocational teachers work with colleagues, the community, business and industry, and postsecondary institutions to extend and enrich the learning opportunities available to students and to ease school to work transitions.

Ambitious goals for instruction often demand extraordinary means. Exemplary vocational educators pride themselves on making the best connections possible between school and the workplace. Alert to student needs for relevancy and engagement, they understand they are more likely to meet this demand through the development and maintenance of several types of collaborative partnerships, including professional colleagues, local businesses and community and post-secondary institutions. Partnerships of several varieties are integral to program design and implementation because vocational education is about connection — connecting vocational knowledge to other disciplines, connecting theory to practice, and connecting students' immediate lives to their future.

Collaborations are also a means to garner support for the field. Vocational educators are often in the position of having to serve as advocates of their programs before administrators and the community. They are able to articulate to both other educators and lay audiences the virtues of their programs, and identify potential threats to program integrity. The partnerships vocational educators forge with like-minded individuals in their schools and communities often serve to further the status of and support for vocational education.

Building Partnerships with Business, Industry, Labor and the Community

Teachers cultivate extensive partnerships with businesses, industries, agencies, labor and the community to ensure program content is well aligned with the demands of work. Although their partners may vary from community to community, teachers cultivate relationships with such individuals and organizations in the name of both program viability and excellence. Together these partners may serve a variety of functions, including curriculum development, standard setting, equipment and technology procurement, and the design of workplace learning opportunities such as apprenticeship and internship experiences.

Teachers ensure the appropriateness of placement through the establishment of internships and other opportunities that are well matched with student needs. Some students need narrow experiences to help refine a future career focus, while others need to expand their horizons. Given this, teachers work collaboratively with business and community partners to negotiate beneficial opportunities for students according to student needs, classroom and industry standards and the needs of local industry. Teachers also rely on these groups for the use or donation of equipment and materials, job placement, job-shadowing experiences, inservice programs and workshops. They are adept at assessing the field for firms that will offer experiences, equipment or training most consistent with their program goals. In addition, they look to business to help them update their industry knowledge, standards and skills, and to arrange for teacher externships.

Collaborating with Vocational Educators and Colleagues from Other Disciplines

Designing an integrated curriculum is central to broadening the base of contextual learning activities and creating rich learning experiences for students. Collaboration runs in direct opposition to years of teacher work within a single discipline, a culture based on isolation and non-interference. Nonetheless, accomplished vocational teachers are adept at working in and leading teams of teachers and industry personnel and at creating integrated projects. They have knowledge and experience in project-based and integrated curriculum, including the different ways to go about both. In addition to the actual content and mechanics of integration, they are skilled at getting teachers who are used to practicing independently to work together to achieve common goals.

Collaborating with Postsecondary Colleagues

Teachers' concerns extend beyond providing students with experiences in the workplace, to encouraging them to experience and explore postsecondary education. Teachers take the responsibility to provide them with exposure to and experience in postsecondary schools. They are also skilled in working with colleagues in postsecondary institutions to achieve this end. Their skill in encouraging postsecondary options coincides with current efforts to more tightly align secondary vocational education with postsecondary vocational education through articulation agreements, sequenced curriculum and partnerships. Embedded in this idea is the creation of sequenced courses to create a seamless curriculum between high school and community or technical colleges. Exemplary teachers are adept at developing partnerships that begin the process of institutional alignment by encouraging the involvement of postsecondary faculty and staff to help define program goals and content.

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Standard XI:
Contributions to the Education Profession

Accomplished vocational teachers work with colleagues and the larger education community both to improve schools and to advance knowledge in their field.

As professionals, exemplary teachers see their responsibilities extending beyond the classroom to the welfare of their school, their colleagues and their area of expertise. They see themselves as prominent members in the larger learning community, contributing to the professional culture and intellectual environment of the school. They can often be found serving a variety of roles in such areas as school-based management and staff and curriculum development.

Contributing to the School

These teachers are team players who believe they have much to contribute as well as much to gain by collaborating with others. They challenge ideas and assumptions as they build a robust curriculum and strong professional culture with their colleagues. Proud and sure of the value of their programs, they seek to repair the historical and dysfunctional split between academic and vocational, and non-college and college bound students. As change agents and leaders in the school, they are central actors in redesigning the secondary school experience for all students. In doing so, they draw upon a range of disciplines through practical, vocational applications.

Collaborating with Colleagues

Teachers also act as a resource to other colleagues, perhaps as a mentor teacher, peer coach, or student teacher supervisor. They may help develop lessons and curriculum or design and provide staff development. They may observe colleagues at work and serve as a "critical friend," sharing with them their observations and coaching them toward stronger practice. Because of the positive ripple effect it has on student learning, the goal of such work is to help create a healthy professional environment and culture built upon a foundation of continuous reflection, insight, new ideas and teamwork.

Advancing Knowledge in their Field

On a larger scale, teachers are equally committed to advancing their field and therefore may contribute to a variety of professional development activities that extend beyond their school. This might include collaborating with other teachers and administrators in district, state, regional, national and international efforts. They may appear on the programs of or take on leadership responsibilities in state, regional or national organizations that support the improvement of vocational education and the professional growth of experienced and novice teachers. They might also collaborate with faculty from postsecondary education to seek solutions to pressing problems in the field, conduct action research in their own classroom, or publish articles in professional journals about their own approaches and methods. They seek out such opportunities based on their belief that they have real potential for constructively affecting the quality of teaching both locally and on the larger education landscape.

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Standard XII:
Family and Community Partnerships

Accomplished vocational teachers work with families and the community to achieve common goals for the education of all students.

Families and community members can be among a teacher's strongest allies in the education of adolescents and young adults. Teachers understand and value the central and distinctive role they play and find opportunities to build strong partnerships with them. Teachers welcome their participation in class activities and take the initiative in encouraging them to become a part of school life. They also understand, however, that the nature of the family has evolved significantly from earlier times.

Teachers know the role of families and the community is not only to provide input. They clearly signal through word and deed the importance of both as partners with the school in preparing young people for the adult world. As teachers work to create a sense of community among the school, students' homes, workplace mentors and community agencies, they demonstrate the mutual interest they share with families in seeing students succeed.

Gaining Insight into Students Through Partnerships with Families

Teachers recognize families have experiences and insights that, once tapped, can enrich the quality of education for students. Involvement with families helps teachers learn about students' backgrounds, creating a window through which they gain insight into parental expectations and aspirations for their children. Such an understanding of students' lives outside of school is often helpful in tailoring curriculum and instruction within the school. Regular interaction also helps teachers establish rapport with families. It also holds the promise of stimulating family support and involvement with their children's education. However, these relationships may not be uniformly congenial or productive. When confronted with difficulties in relationships with families, teachers seek common ground and attempt to build understanding that will serve students' best interests.

Cultivating Families' Interests in Supporting their Children's Education

Teachers effectively communicate with families about students' accomplishments, successes and needs for improvement, including means for attaining higher goals. With students of this age, a primary concern of families is postsecondary education and training and the employability of their children. Families often have concerns or questions about different options or opportunities. Teachers attempt to respond thoughtfully and thoroughly to such healthy interest in students' futures. They also inform families of the consequences of course selection, work-based opportunities and of the importance of planning further education.

Because school today is often different from the experiences of many family members, teachers search for ways to share the school's objectives and expectations for its students, as well as the reasons for group or individual assignments. They also provide families with an accurate portrait of student progress. They are able to offer parents suggestions on how to help students develop better learning habits and skills, complete homework, set goals and improve performance. As necessary, teachers may

address other family needs by assisting them in finding additional resources and services outside the school, such as health care and counseling.

Cultivating family interest extends beyond the traditional classroom setting. To enhance student progress, teachers actively seek to involve families in every aspect of the educational process.Collaboration with families is an essential tool in providing students with the support, motivation and understanding they desire and need. Teachers help establish avenues for family input and involvement in the development of curriculum and school improvement plans. One promising approach is to have families participate in classroom activities such as computer or technology simulations. Through such participation, families learn about often unfamiliar techniques and processes which ultimately will help them understand classroom expectations, content and activities. Exemplary teachers keep families informed of these avenues and encourage their participation. They also encourage their participation in school-wide programs. Because parents are often unfamiliar with school processes and policies, teachers help them understand them, thereby increasing the likelihood they will remain involved in students' education.

Teachers also encourage support from families in ways that help improve schools. Although input and support on individual student or overall classroom issues are the primary role families play in schools, teachers also know the importance of family and community involvement in the overall functioning of the school. Exemplary teachers seek parental support for their programs in terms of helping to evaluate current effectiveness and guide future directions, and recognize that, particularly from the standpoint of programs that are often neglected and beleaguered, an active and involved parent community can be the difference between a marginal program and a robust one.

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Epilogue

These twelve standards provide a profile of exemplary vocational education teachers. While in sum they may seem extraordinarily demanding, every day they are upheld by teachers like the ones who live in these pages, who are hard at work in our schools inspiring the nation's youth. Too many go unnoticed and unappreciated. National Board Certification holds the potential to change this state of affairs.

These standards also promise to be a stimulus to self reflection on the part of teachers at all levels of performance, a catalyst for a healthy debate and the forging of a new professional consensus on exemplary practice in this field. If these standards can advance the conversation about excellence in teaching in these directions, they will provide an important step toward satisfying the National Board's aim to improve student learning in America's schools.

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Vocational Education
Draft Standards Feedback Form

Name_____ Title_____

School Name_____ School District _____

School Address _____ Phone_____

Home Address _____ Phone_____

1. **Age(s) of students taught** _____
2. **Total years of experience:** in education _____ teaching in current school _____
3. **What is your highest earned degree?** _____
4. **Gender:** Female ❑ Male ❑
5. **Ethnicity:** African-American ❑ Asian/Pacific Islander ❑ Latino ❑ Native American ❑ White ❑ Other ❑ [Specify]_____
6. **Job description:** Teacher ❑ Administrator ❑ Other ❑ [Specify] _____
7. **Would you apply for this certificate if there were tangible benefits associated with it?** Y ❑ N ❑
   Under what conditions, if any? Why or why not?

Please circle the appropriate number for each question. 1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	**This standard describes a critical aspect of accomplished teaching practice within this field.**	**I feel confident that I could meet this standard.**	**This standard is easily understood.**
Knowledge of Students Teachers are dedicated to advancing the learning and well-being of all students. They personalize their instruction and apply knowledge of human development to best understand and meet their students' needs.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Knowledge of Subject Matter Teachers command a core body of general vocational knowledge about the world of work in general and the skills and processes that cut across industries, industry specific knowledge, and a base of general academic knowledge. They draw on this knowledge to establish curricular goals, design instruction, facilitate student learning and assess student progress.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Learning Environment Teachers efficiently manage their classrooms and create an environment that fosters democratic values, risk taking and a love of learning. In this environment students develop knowledge, skills and confidence through contextualized learning activities, independent and collaborative laboratory work, and simulated workplace experiences.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Advancing Knowledge of Vocational Subject Matter Teachers foster experiential and performance-based student learning of vocational subject matter by creating important, engaging activities for students that draw upon an extensive repertoire of methods, strategies and resources. Their practice is also marked by their ability to productively integrate vocational and academic disciplines.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

- continued on other side -

Please circle the appropriate number for each question. 1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	**This standard describes a critical aspect of accomplished teaching practice within this field.**	**I feel confident that I could meet this standard.**	**This standard is easily understood.**
Workplace Readiness Teachers develop student career decision-making and employability skills by creating opportunities for students to gain understanding of workplace cultures and expectations.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Managing and Balancing Multiple Life Roles Teachers develop in students an understanding of the competing demands and responsibilities that are part of the world of work, and guide students as they begin to balance those roles in their own lives.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Social Development Teachers develop in students self-awareness and confidence, character, leadership and sound personal, social and civic values and ethics.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Assessment Educators utilize a variety of assessment methods to obtain useful information about student learning and development, to assist students in reflecting on their own progress and to refine their teaching.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Reflective Practice Teachers regularly analyze, evaluate and strengthen the effectiveness and quality of their practice through life-long learning.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Collaborative Partnerships Teachers work with colleagues, the community, business and industry, and postsecondary institutions to extend and enrich the learning opportunities available to students and to ease school to work transitions.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Contributions to Professional Community Teachers work with their colleagues and with the larger professional community both to improve schools and to advance knowledge and practice in their field.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Family and Community Partnerships Teachers work with families and communities to achieve common goals for the education of all students.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Please provide any additional comments below.
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