MPR
Associates, Inc.

&

AED
Academy for
Educational
Development

# Assessing Technical Achievement in Secondary Career Technical Education

## Overview of State Assessment Systems

Prepared for:

**National Research Center for Career and Technical Education**
1954 Buford Avenue
St. Paul, MN 55108-6197

2006

Submitted by:

**MPR Associates, Inc.**
2150 Shattuck Avenue, Suite 800
Berkeley, California 94704

&

**Academy for Educational Development**
**National Institute for Work and Learning**
1825 Connecticut Avenue, N.W.
Washington, D.C. 20009-5721

Contact:
Steven Klein
(sklein@mprinc.com)
503-675-6619

## TABLE OF CONTENTS

States are using a variety of approaches to assess secondary students' career technical education (CTE) skill attainment under Perkins. According to data reported in the U.S. Department of Education's *Report to Congress on State Performance, Program Year 2002-03*, states and territories are currently using the following approaches to collect performance data for the CTE skill attainment measure:

- National/State/Local Assessment Systems — 30 states
- Grade Point Average in Occupational Subjects — 9 states
- Program Completion — 8 states
- Course Completion — 7 states

Although it appears that grantees have limited their measurement to these four collection strategies, with most using some form of national, state, or local assessment system, in practice state accountability systems produce very different types of data, even when controlling for measurement approach. For example, states using national assessments may tailor exams to address state CTE standards, include different students in their population base, or establish different performance thresholds to indicate skill attainment. Consequently, there is presently little consistency in how states assess CTE skill attainment for Perkins reporting purposes.

A review of state measurement approaches conducted for this paper indicates that roughly one-third of states (36 percent) are using some form of vendor-developed assessment system, or their own state-established exam to collect skill attainment data for Perkins reporting purposes. Many states are concurrently using state licensing or industry credentialing exams to award skill credentials to secondary students, although not all choose to report this information for Perkins accountability purposes.

This paper summarizes three strategies that states are using to quantify students' CTE skill holdings: national assessments systems; state developed occupationally specific, end-of-course or program exams; and state-developed, occupationally generic, end-of-program exams. The paper also profiles collection systems in a subset of states representative of each assessment approach. State profiles detail the (1) primary characteristics of state assessment systems (2) process and cost of developing assessments; (3) test administration policies and procedures; and (4) the potential portability of these systems to other states. This information is intended to help inform

policy discussions that will occur at an upcoming, OVAE-sponsored conference on student CTE skill assessment hosted by the National Research Center for Career and Technical Education.

### *Identification of Sources: Data Collection Methodology*

To profile state measurement strategies, MPR researchers reviewed the extent literature on state assessment systems. This included conducting web searches of reports available on the Internet, information posted on the website of the National Research Center for Career and Technical Education (www.nccte.org), the National Association of State Directors of Career Technical Education (www.careertech.org), the National Occupational Competency Testing Institute (www.nocti.org), VTECS (www.vtecs.org), WorkKeys (www.act.org/workkeys), and OVAE's Peer Collaborative Resource Network (www.edcountability.net).

Researchers also conducted on-line searches of resources available within state department of education websites for states identified as having developed or implemented standardized assessments based on national or state CTE standards. States identified for initial follow-up included—Arizona, Arkansas, Connecticut, Idaho, Illinois, Missouri, New Jersey, Pennsylvania, North Carolina, Kentucky, New York, Ohio, Oklahoma, Utah, Vermont, Virginia, West Virginia, and Wyoming.[1]

Based on a review of state information, researchers selected a subset of states using innovative strategies that were judged illustrative of the differing approaches used to assess student performance. These included—***Connecticut, Kentucky, North Carolina, Pennsylvania, Utah,*** and ***Wyoming***. Researchers summarized the characteristics of these state systems using a common protocol to extract information (see Appendix A). State profiles were shared with administrators in participating states, with contacts asked to review the description of their state assessment approach and, where necessary, to make any modifications to ensure that the write-up accurately captured the mechanics of state testing procedures.

[1] While every attempt was made to ensure that states using either a national or state developed, standardized assessment were included, it is possible that there are some states were inadvertently excluded.

## STATE ASSESSMENT APPROACHES

An analysis of state reporting approaches indicates that roughly one-third of states are using some form of standardized national and/or state assessment to collect data for Perkins accountability purposes or to award CTE skill certificates in addition to a regular high school diploma. Generally, states fell into one of three assessment categories. Some states have opted to use national assessments to track student performance, with third-party, occupationally specific tests serving as the primary assessment tool. Other states have established their own occupationally specific assessments, administered to students following program or course completion. And one state has developed a unique, performance-based assessment to document student attainment of generic work-readiness skills common to all CTE program areas.

Since considerable differences were noted in assessment approaches across the group of eighteen states selected for follow-up, as well as among states using similar assessment strategies, researchers selected a subset of six states that were deemed to be using innovative assessment systems. This section briefly describes the assessment approach used in each of the states identified for this study, with detailed descriptions provided for the six states selected for profiling.

### Strategy 1: National Assessment Systems

Four states—***Connecticut, New Jersey, Pennsylvania,*** and ***Virginia***—currently assess student skill attainment for Perkins using standardized, end-of-program exams developed by third-party vendors, state licensing agencies, or national business and industry associations. A number of other states, including ***Idaho, New York*** and ***Vermont***, encourage local districts to adopt national exams, but have yet to institute a formal statewide assessment system for Perkins reporting purposes. Finally, ***Arizona*** and ***Massachusetts*** are in the process of assessing the feasibility of using standardized, vendor-developed exams to structure CTE reporting in advance of the Perkins reauthorization.

Although each of the identified states uses a combination of assessment strategies to measure skill attainment, most have contracted with, or rely upon the National Occupational Competency Testing Institute (NOCTI) to serve as their primary testing agent. Generally, these states have either worked with NOCTI to develop customized, program specific assessments that align with

their own CTE performance standards, or have authorized the use of existing NOCTI assessments for statewide use.

In addition to NOCTI, identified states are also using their own credentialing exams that are administered by state licensing agencies. These assessments are typically associated with occupations that affect the health or well being of the public, including the health fields, barbering, and cosmetology. Standardized credentialing exams created by national industry associations are also in use. For example, most states have adopted exams created by the National Institute of Machining Skills, Inc. (NIMS) to assess machining and metalworking, and the National Automotive Technicians Education Foundation (NATEF) for automotive repair.

In addition to statewide occupationally specific assessments, some states are using ACT's WorkKeys system to assess student attainment of generic career readiness skills, although no state currently employs the test as its statewide Perkins CTE assessment. According to ACT representatives, the WorkKeys *Applied Mathematics* and *Reading for Information* exams are currently used in ***Illinois***, and will soon be introduced in ***Michigan***, to test all secondary students as part of a statewide assessment system. WorkKeys exams are also employed in some secondary school districts, and more widely at the community college level, to assess students' general work readiness skills.

About the NOCTI and WorkKeys Exams

Most identified states rely on NOCTI to develop and administer a relatively larger proportion of their CTE assessments. NOCTI exams are occupationally specific, meaning that they are designed to assess specific technical skills in a narrow occupational area. The exams are developed by teams of business, industry, and education experts who work to distill critical competencies from occupational and workplace standards. Academic standards embedded within occupations may also be distinguished. Identified skills are used to construct an occupationally specific Job Readiness exam, which prior to release, is piloted in schools around the nation to assess student performance. This development process is intended to ensure that NOCTI exams are valid and reliable measures of occupational content. The organization has profiled 87 Job Ready Assessments for use by secondary agencies, nearly all of which assess occupationally specific skills associated with a discrete CTE program area (three exams focus on general workforce readiness skills). A list of NOCTI exams is included in Appendix B.

The NOCTI Job Ready Assessments consist of a written and performance testing component. Written exams usually consist of 150 to 200 multiple-choice questions, which may be administered either on-line or using traditional paper-and-pencil methods. Students have up to three hours to complete their written assessment, although states may tailor exams to provide shorter testing periods. Performance exams typically have 3 to 5 simulated tasks that students must perform. Performance outcomes are scored by advisory council members or teachers, and may be sent to NOCTI for further processing.

In addition to test development, NOCTI also provides support services to assist states in administering and scoring exams and in reporting student outcomes, using both norm and criterion-referenced scoring criteria. Test results are compiled and sent back to the state to support program improvement efforts and to comply with federal and state accountability requirements.

It appears that NOCTI is expanding its marketing to the field. In an effort to increase business, in September 2005 NOCTI launched a testing initiative geared at encouraging states to adopt NOCTI exams to support CTE assessment. Specifically, the organization has revamped its pricing structure to offer discounted services based on the volume of assessments used, and has increased the type of services offered. For example, states will now be able to bank assessment credit from year-to-year, have access to a customized statewide electronic newsletter, and be provided with a state-branded, online delivery system.

Although no state is currently using WorkKeys as its Perkins technical skill attainment measure, WorkKeys is a unique assessment designed to assess individuals' general work readiness skills across a number of dimensions. Assessments exist in ten content areas, including:

- *Reading for Information*
- *Applied Mathematics*
- *Business Writing*
- *Writing*
- *Locating Information*
- *Teamwork*
- *Observation*
- *Listening*
- *Applied Technology*
- *Readiness (screening assessment)*

Unlike the NOCTI exams, which measure occupationally specific skills in a specific occupation, WorkKeys assessments measure basic skills that all workers require to succeed in the workplace. For example, the *Reading for Information* test measures the skills that people need to read and use written information as part of their job. Test items require individuals to read and interpret a variety of workplace communications, including memos, letters, directions, signs, bulletins, policies and workplace regulations. Other tests assess other broad, career-readiness skills.

Educators and employers can use WorkKeys to assess whether individuals have the skills needed to succeed in the labor market in general, or in a specific occupational area. To do so, WorkKeys has profiled the skills required for success in any of 10,000 job titles, ranging from accountant to welder. These skill levels have been cross-referenced with WorkKeys skill levels that an individual must have to perform successfully. According to ACT, by comparing occupational job profile data with students' WorkKeys test scores, an educator or employer can reliably predict whether an individual has the skills needed for success.[2] Although WorkKeys has not, to date, achieved as widespread use at the secondary level as NOCTI, it might have the potential to serve as a cost-effective approach for assessing the work readiness skills of all students pursuing studies in occupations that share a similar base of skills, such as those found within a career cluster area.

National Assessment State Profiles: Connecticut and Pennsylvania

To illustrate state approaches using national assessments, this paper profiles assessment systems used in ***Connecticut*** and ***Pennsylvania***, which have taken slightly differing approaches to instituting CTE assessments (see Appendix C for a detailed summary of state systems). In particular, ***Connecticut*** has partnered with NOCTI to create customized exams that align with state-identified CTE performance standards and competencies, as well as nationally recognized industry standards. Since educators are required to align their curriculum with state CTE standards as a condition for receiving state funding, tailoring NOCTI exams to existing state standards has helped ensure that CTE educators are preparing students for assessment success.

***Pennsylvania***, in contrast, has opted to assess students' skill attainment using existing, NOCTI Job Readiness Assessments.[3] This has required that state educators reevaluate their curriculum to ensure that students are being prepared for the test. Since the state had not adopted a set of performance standards for CTE—a generic set of standards is currently in development—local administrators are encouraged by the state to identify gaps between their local curriculum and national standards.

To help align curriculum, Pennsylvania educators are encouraged to draw on NOCTI resources, which include assessment blueprints that have been developed for each of the organization's Job

[2] Information drawn from ACT's WorkKeys website: http://www.act.org/workkeys/index.html

[3] During initial development, the state also worked with NOCTI to align CTE assessments in approximately 20 high use occupational areas with the Pennsylvania math standards. This was done in an attempt to assess the contribution that CTE makes to students' academic attainment: scores on the state academic assessment in the 11th grade were to be compared with scores on students CTE assessment administered in the 12th grade.

Ready Assessments. NOCTI blueprints provide an outline of the assessment instrument, identify core competencies and tasks associated with the exam, and provide sample questions and jobs for which the assessment would apply. Since a good school curriculum is one based on the critical core competencies required within an occupation, NOCTI contends that there should already be a high degree of correlation between NOCTI assessment content and secondary curriculum.

In addition to the pedagogical implications of aligning (or failing to align) state standards with assessments, there are also fiscal tradeoffs between the two state approaches. In ***Connecticut***, the cost of aligning NOCTI exams with state standards required that the state make an initial investment, estimated at $300,000, to align 18 CTE assessments. In contrast, Pennsylvania incurred no quantifiable cost in adopting NOCTI, since local districts rely on 'off-the-shelf' exams for assessment purposes. However, since educators may have been required to revamp their curriculum to comply with NOCTI assessments, it is likely that districts incurred some cost in shifting to the new assessment approach.

Both states have contracted with NOCTI to administer annual exams (either on-line or in paper and pencil format), and to score and report assessment outcomes to the state. The per-student cost of administering a Job Ready Assessments varies with the type of assessment and manner in which it is administered. For the 2005-06 school year, NOCTI charged states $20 for each student who was administered an on-line multiple-choice exam and had a performance rating entered, and $25 for each student administered a paper/pencil multiple choice exam and a paper/pencil performance rating entered. Costs vary with the options selected. According to state administrators, ***Connecticut*** spent approximately $265,000 and ***Pennsylvania*** approximately $540,000 in assessment costs in the 2004-05 school year.

National Assessment: Other State Testing Efforts

A number of states, including ***New Jersey*** and ***Virginia,*** are using NOCTI exams in conjunction with tests developed by national business and industry groups. For example, ***New Jersey*** recognizes both NOCTI and VTECS tests, in that order, as acceptable measures of student CTE skill proficiencies. The state also accepts industry-endorsed competency exams in fields in which licensure is required or exams are recognized by the National Skill Standards Board.

In ***Virginia***, which bases Perkins reporting on student attainment of state-identified CTE competencies, the State Board of Education has provided for students to obtain a CTE seal on their high school diploma. To earn a seal, students must fulfill the requirements for a standard or advanced studies high school diploma, complete a prescribed sequence of courses in a CTE program, and either (1) maintain a B or better average in CTE courses, (2) acquire a professional license in a CTE field, or (3) pass an exam that confers certification from a recognized industry or professional association. As part of this requirement, the state has compiled a list of acceptable national industry certification exams (e.g., ASE), as well as endorsed 48 NOCTI occupational competency exams.

***New York*** students who successfully complete a NOCTI or other national industry exam are also eligible to earn a technical endorsement on their high school diploma. (For Perkins reporting purposes, the state reports on the vocational-technical GPA of CTE concentrators.) Since the state does not approve, endorse, or certify technical assessments, school district or career technical high school administrators are free to select their own assessments from a state-identified pool of exams. To assist local districts in identifying qualifying national and state assessments, the state has compiled a list of exams and the sponsoring organizations in each trade area. For example, districts interested in offering a technical endorsement in welding may consult with the American Welding Society, New York State Department of Transportation, or NOCTI to identify exams.

Similarly, in ***Idaho***, which does not have a single statewide assessment, local districts assess student skills by selecting their own exams. Districts choose from a variety of options, including those produced by NOCTI, as well as developed by other states. The state of ***Vermont*** also seeks to provide students with access to industry-recognized credentials in areas where credentials exist. The state is seeking to identify credentials at the highest levels possible that meet a program's focus and that stay abreast of industry standard/credentialing options as they develop.

Finally, conversations with educational administrators in ***Arizona*** and ***Massachusetts*** indicate that these states are in the process of working with NOCTI to identify occupationally specific exams that local districts can use to assess student skills. States are still early in their development process, however, and currently working to determine a price structure, organization, and funding source to structure their testing programs.

In sum, a small number of states are contracting with NOCTI or adopting credentials developed by national industry groups or professional associations to structure their CTE assessments. There

are several advantages in using industry-developed assessments for local use. Adopting industry-developed exams means that students are assessed for workplace skills that employers' value, ensuring that instruction is aligned with industry needs. States can also avoid upfront development cost associated with designing assessments for each of the program areas offered within the state, along with the responsibility of having to update exams to keep pace with industry developments. Subcontracting assessments can, however, mean that states are forced to rely on a third-party agency to determine the content of their CTE assessments, as well as incur an ongoing, per student cost in administering and scoring student exams.

**Strategy 2: State Developed, Occupationally Specific, End-of-Course or Program Exams**

Seven states—***Kentucky, Mississippi, North Carolina, Ohio, Oklahoma, Utah,*** and ***West Virginia***—have established end-of-course or program assessments, aligned with state standards, to assess student CTE skill attainment. With some exception, these state-developed tests tend to be program specific, meaning that students must demonstrate occupational specific skills associated with a discrete occupational area. As might be expected, there is considerable variation among states in how these assessments are structured.

State Assessment Design

The development of state assessments typically begins with states establishing a core set of CTE standards and competencies within a given program area. This process usually entails convening a group of state educational and workforce experts, including state and local CTE administrators, CTE educators, and business and industry representatives. Committee members are tasked with assessing state and national employer needs and surveying existing national standards for occupations associated with a given program area.

Once a set of CTE competencies are identified and validated, committee members, with the support of testing experts, begin developing test questions, and in some cases, performance tasks that align with identified standards. Initial tests are usually piloted with a subset of schools to assess the validity and reliability of exam questions. Skill standards may also serve as a basis for developing instructional materials or a statewide curriculum that is aligned to state assessments.

While creating exams in this way can increase buy-in among educators, drafting state standards and assessment can be an expensive process. Given the large number of CTE courses or programs that are offered, developing a statewide, occupationally specific testing program can require that

states invest substantial resources in identifying and validating the technical skills employers desire in a range of programs, and in designing assessments that align with these standards. Unfortunately, the literature provides relatively little guidance on the actual cost of developing state standards, in part because system development often takes place over many years, and in part because not all costs (e.g., task force members' time) is accurately quantified.

State End-of-Program Assessment: Kentucky, North Carolina, and Utah

To illustrate the structure of state testing programs, this section profiles three states—***Kentucky*** and ***Utah***—which base assessment on state-developed, end-of-program exams, and ***North Carolina***, which structures assessment around state-developed, end-of-course exams. A detailed description of these systems is provided in Appendix D.

States establishing their own testing systems must often create a large number of assessments to achieve program coverage. To date, ***North Carolina*** has developed roughly 130 end-of-course curricular blueprints and assessments, while ***Utah,*** which offers end-of-program assessments, has established 133 occupationally specific exams. However, not all states have sought to develop assessments for all occupations: ***Kentucky*** has confined assessments to 19 content areas, in most cases using one exam to address multiple career majors in a career cluster area. For example, the state assessment for the Manufacturing Career Cluster area encompasses ten career majors, including welding, machine tool technician, and industrial electronics.

Unlike states that use NOCTI or other industry-developed exams, states creating their own, occupationally specific end-of-course or program exams are responsible for maintaining or expanding their CTE assessments. For example, during the 2004-05 program year, ***North Carolina*** reported validating and determining reliability levels for student assessment measures contained in 64 course blueprints, aligning 5 courses with national curricular standards, and developed 59 test item banks to assess local educators in developing assessments to prepare students for state exams.

While there is undoubtedly a substantial expense associated with instituting state-specific CTE assessments, state profiles suggest that administering statewide testing programs need not be prohibitively expensive. For example, ***Utah*** estimates that it is able to maintain its annual testing program for less than $400,000 a year, with districts providing roughly half of all resources. Federal Perkins funding is used to offset state level expenditures. State administrators in ***Kentucky*** report budgeting just $80,000 per year to maintain the assessment system, which

includes the cost of compensating occupational taskforce partners, producing assessments, scoring exams, and reporting performance results. Similarly, administrators in ***North Carolina*** report that the state spends about $100,000 annually on the testing effort, including development of test items, validation and reliability testing, creation of tests, development of manuals used in testing, and duplication.

State-Developed Assessments: Other State Testing Efforts

Among states employing end-of-program assessments, ***Oklahoma*** stands out as a leader in the competency-testing arena. Since 1980, the Oklahoma Department of Career and Technology Education has worked to (1) identify skills standards that reflect the knowledge and abilities needed to perform jobs within an industry, (2) develop curriculum that helps students attain the content identified in the skills standards, and (3) create competency assessments that align with the skills standards taught using the curricular materials. To assess student performance, the state has developed more than 128 occupationally specific, end-of-program tests. These exams consist of a performance evaluation and written competency assessment. The state has also recognized over 200 alternative assessments, including industry certifications, licensure exams, and tests developed by NOCTI, Brainbench, and other agencies, that may be used in place of state-developed written competency assessments.

***Ohio*** also maintains a sophisticated end-of-course and program assessment system to test student entry-level occupational knowledge. A total of 48 criterion-referenced occupational assessments have been developed, with each exam linked to an Occupational Competency Analysis Profile or Integrated Technical and Academic Competency list. End-of-program tests, consisting of roughly 100 multiple-choice questions, are typically administered to seniors during or after completing their last class in a CTE sequence. Modular tests consisting of 20 to 30 multiple-choice items associated with a single-unit instructional area, are designed for juniors or seniors following course completion. Generally, a program will consist of a sequence of 8 to 10 modules. Exams may be administered either on-line or using traditional paper and pencil approaches. Similarly, ***West Virginia*** provides for end-of-course technical skills tests to assess students' attainment on state content standards and objectives. The state currently provides for 117 exam areas.

The state of ***Mississippi*** assesses CTE skill attainment using the Mississippi Career Planning and Assessment system. Occupationally specific assessments are administered to all secondary students completing a CTE sequence. The state currently maintains 31 program area exams that are aligned with CTE curricula, and are revised on the same four-year cycle as the curriculum

they are designed to assess. Test item questions are administered as multiple-choice options, with students entering their answers on machine scannable forms. As of the 2005-06 school year, the state has discontinued use of ACT's WorkKeys Workforce Readiness Assessment for CTE concentrators, primarily because local districts were not requesting it for their use.

In sum, states that develop occupationally specific, end-of-course or program exams face the prospect of creating and updating a multitude of assessments for different occupations, and in some cases multiple skill levels within a single occupation. Annual state investment following test development need not be prohibitively expensive, however, with some state maintaining testing services at a fraction of that spent in the academic arena. Moreover, since testing systems are owned by the state, the marginal cost of assessing students can fall with use.

Since assessments are usually tailored to address state CTE standards, it is unlikely that most occupationally specific assessments can readily transfer across states, although it is difficult to assess this without a more detailed comparative study of state systems. It is possible that state standards in some occupations may overlap, particularly if a set of nationally recognized standards exist and have been consulted in states' standards and assessment development process. Given the amount of work required to develop state standards and assessment systems, states would benefit from sharing their existing systems to avoid unnecessarily duplicating effort.

**Strategy 3: State Developed Occupationally Generic, End-of-Program Exams**

Wyoming monitors the skill attainment of CTE concentrators using the Wyoming Career Technical Assessment (WyCTA), an electronic, state-developed testing instrument that assess a broad set of work readiness skills common to all CTE programs (see Appendix E). Performance assessment areas contained within the WyCTA directly link to state content standards that were established based on recommendations contained in the 1991 report, *What Work Requires of Schools: A SCANS Report for American 2000*—published by the Secretary's Commission on Achieving Necessary Skills—and the National Career Development Guidelines, developed by the National Occupational Information Coordinating Committee (NOICC) in 1989.

Wyoming's CTE standards specify the general skills students are expected to master and perform. These standards are not intended to serve as either instructional curricula or technical documents to guide day-to-day instruction; rather, teachers are expected to consult the standards when developing curriculum. Standards are organized into six major strands:

1. Resources: Students manage time, money, materials, facilities and human resources.
2. Interpersonal Skills: Students acquire and demonstrate interpersonal skills necessary to be successful in the workplace.
3. Information: Students acquire and use workplace information.
4. Systems: Students demonstrate an understanding of how social, organizational and technological systems work.
5. Technology: Students demonstrate the ability to use a variety of workplace technologies.
6. Careers: Students develop skills in career planning and workplace readiness.

The WyCTA provides performance rubrics covering six content areas: Communication, Applied Math, Affective and Thinking, Technology, Pre-Employment, and Employability. These content areas align with the content strands, content standards, and benchmarks identified in the state standards. Each content area identifies a set of sub-skills that are used for actual rating purposes.

Unlike most state assessments, which combine a program specific set of multiple-choice questions with a performance assessment, the WyCTA is solely performance-based: students are rated based on their ability to demonstrate generic skills specified in a set of 18 scenarios. Students are rated on their performance by educational staff trained to serve as WyCTA evaluators. Whenever possible, CTE instructors are the first choice to serve as raters, since evaluators must be able to observe students over an extended period of time; however, academic instructors, guidance counselors, and other school staff may also serve as raters.

Evaluators are provided with a standardized set of rubrics, rubric instructions, and a set of sample prompts for each performance scenario. Evaluators use these rubrics to assign a rating to students on each WyCTA sub-skill area, based on observations that the evaluator makes in the classroom or other work situation throughout the academic year. In addition to rubrics and prompts, raters may consult student portfolios, projects, and other written assessments for use in triangulating ratings. Students have between one to two weeks to complete their assigned problem. All student ratings must be completed by April of the current school year.

Unlike other state assessment systems, the WyCTA provides educators with an extended opportunity to observe student performance on a task that requires a range of skills. For example, in one performance scenario, entitled “Cats and Dogs Everywhere!” students are asked to solve a problem involving a local kennel. As part of this one-week assessment, students must identify a problem, provide documentation for the solutions they propose, schedule at least two planning sessions that are observed by the project rater, demonstrate using a computer to access and use a word processing program, deliver a presentation to a class or small group, and demonstrate

listening skills by incorporating presentation feedback into a final written presentation of the report. Raters evaluate student performance using a set of performance rubrics that specify the sub-skills used in the problem, with outcomes rated using on a four-point scale.

Although the Wyoming assessment system relies on local educators to assess student skill attainment, the system is built around a sophisticated set of performance scenarios and assessment rubrics that are directly linked to state content standards. Unlike local assessments in other states, in which instructors subjectively assess whether students have attained skill proficiencies, Wyoming educators are trained in the use of standardized, objective measures of skill attainment. Although educators have some flexibility in administering tests (e.g., tailoring prompts to fit local conditions or determining timeline for performance), State commissioned studies indicate the test provides valid measures of student learning, with high levels of inter-rater reliability.

According to state administrators, the decision to adopt the WyCTA was conditioned on a number of considerations

1. *Annual Expense*—To avoid recurring costs associated with administering program specific, vendor developed assessments (e.g., WorkKeys), Wyoming established a single exam that could be conducted by districts without incurring annual charges.

2. *Instructional Time*—Rather than take time out of the instructional day to administer written tests, the state opted for a performance-based testing approach that could be incorporated into classroom activities. This provided an opportunity for students to learn from their experience, while demonstrating their skill mastery.

3. *Local Control*—Wyoming is a rural state with a tradition of local control over curriculum and assessment. Although the WyCTA prescribes a testing approach, local educators have some flexibility in how the test is administered and scored, reducing opposition to the exam.

4. *Authentic Assessment*—Given that SCANS focuses on student attainment of many affective skills (i.e., thinking and personal qualities, which include responsibility, sociability, self management), state administrators believed that a performance-based assessment would permit students to demonstrate these skills in a real world context.

Although Wyoming's performance-based assessment is intended to evaluate student attainment of broad, transferable work readiness skills in a cost-effective manner, it is difficult to quantify the actual expense associated with testing. Like most states, Wyoming has invested substantial resources to develop its testing instrument; however, the testing program has evolved over time, making it difficult to separate out initial development costs from those associated with the final assessment.

Although annual state expenditures for skill testing are limited to compiling and analyzing testing results, local educators invest a substantial amount of time administering, evaluating, and reporting test ratings. The cost of this instructional time, which may be spread over two or more weeks, is difficulty to quantify.

In sum, Wyoming has taken a unique approach to CTE skill assessment, one that balances state needs with federal reporting requirements. Use of a standardized, locally administer performance-based assessment, aligned to a state CTE standards, has enabled state administrators to assess student attainment of generic work readiness skills common to all programs. This has helped the state to contain assessment costs. Although the state CTE standards and assessments are tailored to state needs, Wyoming's assessment model could be readily transferred to other states. This would require, however, that states institute and administer a complex assessment system. Given the effort associated with rating individual student performance, the Wyoming approach may be more suited to states with smaller CTE student populations.

## CONCLUSION

States are using a variety of approaches to assess secondary students' CTE skill attainment. Among states using some form of standardized skill assessment, roughly half are using vendor-developed occupationally specific tests, supplemented with state and industry credentialing exams. Remaining states conduct assessments using state developed exams, with most focusing on student attainment of occupationally specific skills. Irrespective of testing approach, in most cases CTE assessments align with both nationally defined occupational standards and state-established CTE performance standards.

State profiles indicate that states face both start-up and recurring costs in adopting CTE assessment systems. Unfortunately, state representatives were unable to fully quantify the cost of exam creation in the timeline adopted for this paper. Difficulties in quantifying costs are related to the extended time period over which assessments were developed, the number of occupational areas selected for assessment, the types of occupations selected, and the difficulty administrators have in estimating the cost task force members' time. It appears that, once developed, states are investing between $100,000 to $500,000 annually to maintain their assessment systems. Costs vary across states, however, as a function of testing approach, the number of CTE exams used to test students, and the number of students participating in exams.

In most instances, states are using their federal Perkins funding to maintain state testing systems. While local districts typically do not have to pay to participate in the assessment system, local educators are usually responsible for administering assessments and, in some states, scoring performance outcomes. This can require that staff receive specialized training and use instructional or other time to conduct assessments. Local educators may also incur some costs in duplicating test materials or in transmitting test documents to the state.

Due to study limitations, it was not possible to compare the relative cost of employing third-party assessment systems (i.e., national and industry developed exams) to the cost of using state-developed and administered approaches. While more detailed studies of state systems are warranted, it would appear, based on conversations with state administrators, that states using standardized, vendor- or industry-developed national exams may face somewhat lower start-up costs than states developing their own exams. Savings occur because state administrators do not need to convene task force members to create and validate CTE standards and assessments in each occupational area.

Although fiscal data were not available, it would be interesting to assess the marginal cost of testing students using third-party versus state-developed assessments. Since states contracting with outside vendors face a fixed assessment cost, it may be that state-developed assessments are less expensive to conduct in the long run, depending on the number of students tested, the lifespan of state exams, and other administrative and scoring factors. Indeed, ***Pennsylvania*** reports that it spent roughly $540,000 to maintain its statewide testing program in 2005, compared to only about $100,000 in ***North Carolina.***

This statistic takes on meaning when one considers that in the 2003-04 academic year (the most recent for which comparable Consolidated Annual Report data are available, ***Pennsylvania*** reported testing just 16,057 CTE students, compared to 269,147 end-of-course assessments administered in ***North Carolina.*** This suggests that the per-student cost of assessment in ***Pennsylvania*** is roughly $33.50, compared to just $0.37 in ***North Carolina***. While there are several problems associated with these calculations, a follow-up study to clarify the actual cost of assessment using different approaches could surface useful information to assist states in selecting a testing strategy.

Another set of questions relate to whether there are any educational advantages to using national versus state-developed assessments. Although conversations with state administrators suggest that states using vendor-developed exams are able to tailor assessments to align with state standards, whether this approach is as effective as developing state-specific assessments is unknown. Conversations with state employers and postsecondary educators could also shed light on whether national or state-developed exams confer any advantages over another, as well as whether CTE assessments in general, help to prepare students for employment or postsecondary advancement.

Finally, although most states have developed occupationally specific assessments, some states have opted for more generic assessments. For example, ***Kentucky*** has designed a system of assessments that are targeted at the career cluster level, and ***Wyoming*** at the general work-readiness level. Is one approach superior to another? Or is a combination of work readiness and occupationally specific exams desirable? Furthermore, how do states that use a written, multiple-choice exam compare to those that combine a written and performance component?

While it is beyond the scope of this paper to answer these and other questions, information contained within the state profiles section of this report can help states as they begin to prepare to adopt new CTE assessment systems. . Initial findings from this paper also suggest that it may be

worth developing a mechanism to allow states that have developed their own assessments to share these tests with other states. If states lacking CTE assessment systems are to develop their own state systems—and additional guidance may be warranted before states proceed in this direction—it may be more cost efficient for states to build off the products developed in other states, rather than attempting to design their assessments from the ground up.

# Appendix A:

# State Data Collection Instrument

## State Profile Data Collection Form

**Assessment History**

*When were assessments instituted?*

- Date instituted

*Why were assessments instituted?*

- Rationale for assessment

**Development Process**

*What was the framework for development?*

- What process was followed to develop assessments?

*Who participated in design/purchase?*

- Which individuals or groups played a role in assessment development?

*How long did it take to develop/institute assessments?*

- What chronology was followed to develop assessments?

*What was the cost of developing state tests?*

- State investment in developing assessments?

*Have new tests been added over time, and if so, why?*

- How has the assessment changed over time, if at all?
- Why were changes necessary?

**Test Structure**

*What types of skills are assessed?*

- What is the structure of the state exam?

*How many tests exist?*

- How many program or course assessments currently exist?

*How is local curriculum aligned to state assessments?*

- What process was used to align curriculum and assessments?

*What are the test components and how are they administered?*

- What are the different test components?

*Are state tests transferable?*

- Can the state testing program be readily adopted by other states?

**Test Administration**

*Which students take tests?*

- Who participates in the testing program?

*When are tests administered?*

- When are tests given?

*Who pays for the assessment?*

- What entity bears the cost of administration?

*How are testing results used?*

- What is the purpose of testing?

**State Contact**

- Name
- Title
- Phone

Appendix B:

# Catalog of NOCTI Job Readiness Assessments

NOCTI
NATIONAL OCCUPATIONAL COMPETENCY TESTING INSTITUTE

# CATALOG OF ASSESSMENTS

## Job Ready

*Your Assessment and Accountability Partner*

**TABLE OF CONTENTS**
(The number following the test title is for ordering purposes.)

**JOB READY ASSESSMENTS**

# Appendix C:

# Profiles of States Using National Assessment Systems

---

Connecticut
Pennsylvania

Connecticut requires end-of-program testing of all CTE concentrators in each of the 18 areas of CTE concentration identified by the State Department of Education for comprehensive high schools and correctional institutions. Each assessment has been validated by individual national business, industry and education committees, who ensured that each assessment was both aligned with Connecticut's state defined performance standards and competencies, as well as existing national standards in each category of concentration.

## Assessment History

*When were assessments instituted?*

Following two years of research and development, in the 2000-2001 school year the Connecticut CTE Assessment program was officially instituted at all Connecticut comprehensive secondary schools and correctional institutions. Targeted as the pilot year of the Connecticut CTE assessment program, the SDE staff researched and designed a system of testing protocols, cyclical communications with high school principals, a multi-layered scoring system, and data reporting procedures.

Twenty high schools were selected to participate in the pilot, representing a cross-section of Connecticut's secondary schools in terms of enrollment, urban-suburban-rural, Education Reference Groups, and those schools with a broad range of CTE course offerings. The analysis of the pilot assessment resulted in substantial changes in our test construction and a number of procedural upgrades.

*Why were assessments instituted?*

With the enactment of the Carl D. Perkins III federal legislation, Connecticut initiated research and development activities to construct a state assessment program for Career and Technical Education that would provide a quality measurement of CTE teaching and learning.

The Connecticut Performance Standards and Competencies are designed to assist local districts in raising expectations, upgrading and improving career and technical curriculum and instruction, promoting growth in student achievement, and preparing students effectively for the career and technical education statewide assessments. In the State Department of Education's plan for the implementation of statewide CTE assessment, local high schools will determine those students who meet the CTE course and competency threshold of being classified as "concentrator." Such classification requires that a student participate in the state assessment process.

## Test Development Process

*What was the framework for development?*

The development of the Connecticut statewide assessment program was initiated with the revision of all performance standards and competencies for each of the seven CTE program areas in 1997. Research was conducted to identify the Connecticut CTE areas of concentration, and all existing national standards for each area. The foundation of the statewide assessment is the testing of only measurable competencies.

*Who participated in design/purchase?*

The entire staff of the Career and Technical Education unit of the Bureau of Early Childhood, Career and Adult Education assembled representatives from the CTE professional teacher organizations, business and industry, and teacher educators for all program areas and identified areas of concentration. Representatives of the National Occupational Competency Testing Institute (NOCTI) assisted in the initial process of aligning state standards with national standards and designed test questions to specifically measure each competency in each area of concentration.

*How long did it take to develop/institute assessments?*

Extensive CTE research began in 1997, leading to the writing of state performance standards and competencies in 18 areas of concentration. Following a year of statewide committee review and revision, tests were designed and piloted in 1999-2000. Analysis of the pilot data resulted in the final construction of version I of the statewide CTE assessment program that was instituted in the spring of 2001.

*What was the cost of developing state tests?*

The approximate cost of the development stage of the Connecticut CTE Assessment Program was $300,000.

*Have new tests been added over time, and if so, why?*

Analysis of data from the pilot year and first two years of testing resulted in the discontinuation of four of the areas of assessment and the inclusion of three areas. In 2003-2004 Version II of the State CTE Assessment program was implemented that included the updated series of written assessments for of the seven career and technical education program areas. Each assessment in Version II was validated by individual national business, industry and education committees whose task it was to ensure that each assessment was aligned with the Connecticut performance standards and competencies and all existing national standards.

**Test Structure**

*What types of skills are assessed?*

Each area of concentration (test category) is based upon the measurement of the State performance standards and competencies. The acquisition of competencies in both CTE and academic courses in each of the areas of concentration are measured in the state CTE assessment.

*How many tests exist?*

The Bureau of Early Childhood, Career and Adult Education in partnership with the state career and technical education teachers and the National Occupational Competency Testing Institute (NOCTI) have developed 18 statewide assessments, covering all the career and technical education program areas, based on the Connecticut Standards and Performance Measures.

The state also collects data on certification tests (CISCO, UNIX, CNA, PLTW, MOUS) that are employed by local CTE programs, but these tests represent a very small percentage of students and schools. These students (concentrators) are required to take the State CTE Assessment in their respective areas of concentration. The state then produces comparative data on the impact of

such industry driven training on the state assessment. As an example, there were only 578 students (concentrators) statewide, participating in industry driven training programs and certifications in 2005. Of these students, 45.6 percent were certified nurse assistant concentrators and only 314 concentrators were from other certification training programs. This represents only 3.29 percent of the total concentrators in Connecticut in 2005.

The focus in Connecticut is clearly on CTE as an impact enhancement for academic achievement and a critical feature in directing students to define a four-year college selection and subsequent degree. Industry tests as an "offered" means of assessment are rare. The state will be adding at least one new area of concentration in this coming year as data (evidence) has clearly defined emerging, sustainable areas of concentration in CTE in Connecticut.

*How is local curriculum aligned to state assessments?*

All components of quality Career and Technical Education are connected in Connecticut. Results and data from the statewide assessment affect program compliance review, statewide professional development and local curriculum revision. All schools receiving Perkins grant funding or services are required to align local CTE curricular with the state performance standards and competencies.

*What are the test components?*

Each tested area of concentration includes a written, multiple-choice examination that addresses all competencies contained in that area. The examination period is 90 minutes.

Performance based assessment was piloted in Connecticut in the Medical Careers program area two years ago. Results of the two-year performance based assessment revealed that the process had two significant problems. First, the TIME involved to train hundreds of local adjudicators was prohibitive. State administrators developed an innovative rubric for performance based assessment, lauded by many Connecticut educators, that was designed to make the evaluation of student performance as objective as possible, eliminating personal preference/inclination/tradition on the part of the industry professional who must evaluate the student. This was a critical piece of performance evaluation development.

The problem with this approach was that to train industry professionals to serve as adjudicators took enormous amounts of time. Given that adjudicators are volunteers, time was not a flexible factor. The second problem with performance based was the expense involved. As budget options were developed, it was easy to see that local schools would have to be willing to absorb some of the cost. Given the limited amount of Perkins funds available for most of the state's secondary schools, a mandated performance based assessment package would be difficult to implement. The state CTE assessment program is a mandate, not an optional function. Therefore, at this time, the state is not planning a performance-based assessment for all our Connecticut high schools.

*Are state tests transferable?*

Research in the areas of concentration suggests that there is not unanimity among states on measurable national standards and competencies for CTE program areas and areas of concentration. The lack of nationally accepted measurable standards and competencies makes the Connecticut CTE statewide assessments unlikely to be easily transferable to other states. The process used to develop state assessments may hold promise for replication in other states.

**Test Administration**

*Which students take tests?*

All Connecticut secondary schools and correctional institutions receiving Perkins funds and/or services are required to test all students reaching the threshold of concentration. In 2005, 143 high schools and correctional institutions participated in the Connecticut CTE Assessment program, testing 8,366 concentrators.

*When are tests administered?*

The Connecticut CTE Assessment program is administered during the month of May in all schools.

*Who pays for the assessment?*

The state has realized a 14 percent growth in statewide concentrators last year (2005). With the increase in concentration, our cost of the state CTE assessment has increased. The cost for the State CTE Assessment in 2005 was approximately $265,000. These resources were paid for using Carl D. Perkins Grant funding. The local school districts (secondary schools and correctional institutions) do not pay anything towards the assessment.

*How are testing results used?*

Test results (scored by performance standard) are promptly (within two weeks of testing-taking) returned to each school principal. Schools have the option of using the state assessment results as a final examination or the wavier of the final exam. Assessment results from each school are analyzed to determine statewide rankings in skill proficiency (1S2) that serves as one of the indicators for program compliance review selection. Results are factors in the design of professional development and local Perkins grant applications. On a statewide basis, the Connecticut CTE statewide assessment data is aggregated and reported to the U.S. Department of Education for federal accountability purposes.

**Contact**

Stephen Hoag, Consultant. State Department of Education, Bureau of Career and Adult Education. Phone: 860-713-6764.

# PENNSYLVANIA

Pennsylvania uses end-of-program Job Ready Assessments to assess the occupational competency of CTE students, with NOCTI exams serving as the primary assessment tool. As of January 2005, the state has identified 85 NOCTI Job Ready Assessments and approved 13 industry-developed assessments for use in assessment. Students who meet the state's testing requirements are awarded a Pennsylvania Skills Certificate.

## Assessment History

*When were assessments instituted?*

In November 1996 the State Board of Education approved an occupational competency measure requiring the use of a student occupational competency assessment for all secondary and adult career and CTE program completers. .

*Why were assessments instituted?*

Tests were instituted to address federal accountability requirements contained in Perkins and because the state is a unified state where state and federal CTE programs are part of the Governor's Executive Order for the Pennsylvania Workforce Investment Board which calls for an integrated workforce investment system with core performance measures and standards. Prior to these requirements, Pennsylvania had in place a Governor's Skill Certificate program designed to recognize high achievement in students' chosen occupational field.

## Test Development Process

*Who participated in design/purchase?*

NOCTI test development included representatives from industry, secondary and postsecondary Education, experts in the field (at least 3 years experience), geographically diverse (at least three states represented). The Pennsylvania Department of Education's (PDE) decision to utilize NOCTI Job Ready assessments was made by management in conjunction with the state's industry representatives, career and technical education school administrators and teachers.

During the process, administrators have learned that there is high value in maintaining constant touch with the state's industry practitioners in revising, updating, benchmarking or even customizing tests. Any decisions that are likely to impact workforce training should have input from those who will hire program completers. Additionally, consult other states and share with them your successes and failures, seeking suggestions on how to improve the assessment system.

*How long did it take to develop/institute assessments?*

This was completed over a six-month period. A state team reviewed all existing tests in terms of test development, scope, scoring and reporting, reliability, revision schedules, and usability. NOCTI was deemed most appropriate for assessment purposes. One of the main reasons for choosing NOCTI was that they had a performance component along with the written test.

*What was the cost of developing state tests?*

The state did not incur any costs associated with developing the tests. Districts select off-the-shelf exams for student assessment.

*Have new tests been added over time, and if so, why?*

The state allows districts to select written and performance tests from those available on the NOCTI website. Any changes or additions to the NOCTI assessments would affect district exam options.

**Test Structure**

*What types of skills are assessed?*

NOCTI tests are designed around criteria for job readiness, meaning that occupationally specific skills are assessed. Reported scores are both criterion referenced and norm referenced. Pennsylvania is developing statewide cutoff scores to establish a competency standard that reflects skills that employers expect from entry-level workers. For sixty-five of the most highly used tests, criterion-referenced cut scores are used to determine competency; the remaining tests use the NOCTI national norm established at the beginning of the testing cycle. Industry exams are occupationally specific.

*How many tests exist?*

Pennsylvania uses five systems of assessment to determine occupational competency of CTE students. These include

1. End-of-program Job Ready Assessments from NOCTI;
2. End-of-program credentialing tests from industries that have training programs;
3. State board tests required for licensure to practice in Pennsylvania;
4. Course specific credentialing tests that cover small portions of a full-approved program;
5. Locally developed tests that meet state and industry established standards.

As of January 2005, the state could choose from 85 NOCTI Job Ready Assessments. In addition to the NOCTI exam, the state has approved 13 tests that students may take to obtain a Pennsylvania Skills Certificate. These tests were developed by the following agencies:

- Air Conditioning & Refrigeration Institute Industry
- American Culinary Federation
- American Hotel and Lodging Association Educational Institute
- American Welding Society
- Computer Technology Industry Association
- Consumer Electronics Association
- National Automotive Technicians Education Foundation
- National Institute for Automotive Service Excellence and the Automotive Youth Educational Systems
- National Institute for Metalworking Skills —Level I
- Nurse Aide Training and Competency Evaluation Program
- Pennsylvania Society of Land Surveyors
- State Board of Cosmetology Examination
- State Board of Licensed Practical Nursing Examination

School administrators may also use end-of-program exams not yet approved by PDE, but must receive approval prior to testing.

*How is local curriculum aligned to state assessments?*

State approved exams are based on national and/or industry/based standards. While these standards frequently parallel local curricula, when they do not, local administrators are encouraged to identify gaps between local curriculum and national standards. To assist educators in selecting an exam, each of NOCTI's standardized assessments has a critical core competency list, which served as the basis of the test's development. Schools are also required to select NOCTI or other PDE approved tests that match local CTE program curriculum content as closely as possible.

*What are the test components?*

The NOCTI Job Ready Assessment is composed of two sections—written and performance. The written test consists of 150 to 190 multiple-choice questions that can be answered in 90 to 120 minutes. The performance test typically takes two to three hours to administer.

*Are state tests transferable?*

Since the state testing system uses NOCTI and other industry-based exams, the Pennsylvania occupational testing system could readily be transferred to other states, assuming states' standards aligned with NOCTI test items.

## Test Administration

*Which students take tests?*

The PDE requires that all secondary and adult scheduled completers in approved CTE programs complete a test if a NOCTI or other PDE approved exam is available. When no occupationally specific test is available, students take the Workplace Readiness test – in conjunction with local assessments administered by the school as required by individual programs

*When are tests administered?*

Tests are administered at any time in March, April, or May of the school year. Testing must be completed by May 31 2005. Schools on a semester basis also test at the end of the first semester (December or January). Course specific tests are administered throughout the year as students progress through a program. For Perkins accountability purposes the accumulated credentials are reported for seniors who are scheduled completers. When licensure tests are taken in the summer the results are reported in the following school year.

*Who pays for the assessment?*

The PDE pays for the costs of NOCTI test booklets, test scoring, and test reporting services. Costs of materials and supplies required for the performance portion of the test are the responsibility of the school. Costs for other PDE approved tests are reimbursed up to $25 per test administered, with the exception of NIMS, which is fully covered for all scheduled completers in the ten NIMS Level I Machining Skill Certifications.

In the 2004-2005 program year a total of $540,000 was spent on student occupational competency assessment. This amount was spent on NOCTI tests and reports, NIMS testing and reports, NOCTI benchmarking costs, reimbursement for other approved tests, and regional workshops on occupational testing. Previous years' costs were slightly lower. Costs for occupational testing are part of the education department's annual budget, in the Assessment line item.

*How are testing results used?*

Program test results are aggregated and reported to the U.S. Department of Education for federal accountability purposes. All students who take the NOCTI Job Ready Assessment and score at or above the "Advanced Level" on both the written and performance portions receive a Pennsylvania Skills Certificate. Students who pass any of the other PDE approved tests are also eligible for a Skills Certificate.

**Contact**

Paul Munyofu, Consultant. Pennsylvania Department of Education, Bureau of Career and Technical Education. Phone: 717-783-6992.

Appendix D:

# Profiles of States Using State-Developed, Occupationally Specific End-of-Course or Program Assessment Systems

---

Kentucky
North Carolina
Utah

# Kentucky

Kentucky has instituted a system of end-of-program assessments that are aligned to state CTE standards. Kentucky has developed 18 different CTE skill standards assessments that are used to students completing one of the 11 career cluster areas adopted by the state. The state also recognizes industry developed certifications developed in some health and information technology fields.

## Assessment History

*When were assessments instituted?*
Following the National Education Summit in 1996, the Kentucky Department of Education in conjunction with other state agencies, set out to develop CTE standards in high demand occupational areas. Manufacturing served as first assessment area, with subsequent career areas modeled on this initial work. The resulting Kentucky Occupational Skills Assessment (KOSSA) program was piloted in 1999, with 7 state assessments. In the following years, additional assessments were piloted and subsequently added to the state assessment system. As of 2005, the state had developed a total of 18 CTE assessments.

*Why were assessments instituted?*
Assessments were instituted as a means of supporting the development of a highly skilled state workforce, as well as to fulfill the state's reporting requirement under Perkins. The assessments are also intended for used as an overall program improvement tool.

## Development Process

*What was the framework for development?*
Kentucky started the assessment development process by bringing together teachers, business partners and postsecondary partners to review existing national standards in high demand career areas. Where necessary, representatives also worked to develop new state standards where national standards did not exist. After the new state standards were developed, task force members worked together to construct and evaluate assessments.

*Who participated in design/purchase?*
Participants in the standards development process included teachers, business and industry representatives, and postsecondary partners.

*How long did it take to develop/institute assessments?*
The development of state assessments has been an ongoing process, with the state expanding from 7 assessments in 1999 to the 18 currently in existence. Each year new items are tested and the taskforce reconvenes to review the existing item bank for each test. For example, there are always 100 multiple-choice items on a test. However, only 75 of the items are valid and carry a point value. Twenty-five of the questions each year are new and administered on a pilot basis.

*What was the cost of developing state tests?*
The state invested $100,000 in 2000 and 2001. In 2002, due to constraints, the budget was reduced to $80,000, where it remains. The budget covers compensating taskforce partners, and producing assessments, scoring, and reports. The original budgets from 2000 and 2001 also covered the purchasing of scoring equipment.

*Have new tests been added over time, and if so, why?*
Kentucky started with just 7 assessments in 1999, with tests associated with career clusters that had the highest enrollments. In 2000, the state added 3 new tests on a pilot basis. In 2001, the existing 10 tests were administered and 8 additional tests piloted bringing the total number of state assessments to 18 in 2003. One additional test was piloted in 2003; however, the state is also dropping its Housing and Interiors assessment in the 2005-06 school year due to lack of interest in schools. Another test may eventually be added for Fashion/Interior Design.

**Test Structure**

*What types of skills are assessed?*
State exams are focused on occupational, employability, and academic competencies. The occupational skills account for 50 percent of test items, with employability and academic skills each accounting for 25 percent of the exam.

*How many tests exist?*
There are a total of 18 KOSSA assessments in the 11 identified career clusters. The state also relies on industry-recognized certifications in certain health science and Information Technology fields.

*How is local curriculum aligned to state assessments?*
The Kentucky Department of Education has worked with teachers to help them understand the importance of aligning their curriculum with state standards. In particular, the state has sponsored summer conferences to train teachers in curriculum alignment.

*What are the test components?*
State KOSSA tests include both multiple-choice items and a problem-based scenario. Multiple scenarios are presented to the students, who select one that they respond to with a one-to-two page essay. The test takes a total of two hours, with one hour devoted to the multiple-choice and one to the scenario. Educators may choose to split the test into two parts, administered over more than one day. The cut off score for passing the assessment is 70% on both the multiple choice and scenario sections.

*Are state tests transferable?*
The certifications that students gain from passing the assessments are endorsed by Kentucky businesses only. They have not been endorsed nationally or reviewed by national industry groups, in part because most Kentucky students stay and work in Kentucky after graduation. Consequently, it is unlikely that state standards and assessments would readily transfer across states.

**Test Administration**

*Which students take tests?*
All Kentucky students completing or planning to complete a sequence (3 courses) of a career and technical education program are required to take KOSSA. Generally, only junior and seniors are assessed; however, in some cases sophomores may quality for assessment. Student unable to pass the assessment in their junior year are eligible to participate as a senior. Although the assessments are voluntary, schools are expected to assess as many students as possible, and to seek to maximize their participation rate.

*When are tests administered?*
During the 2004-05 testing year, the testing window occurred from February 14 to March 11. The state has also begun piloting, in the spring of 2005, an online assessment to enable students to complete the KOSSA on an interactive website.

*Who pays for the assessment?*
The state pays for all assessments. The only cost to the district is related to shipping completed tests back to the state for scoring and reporting. Staff at the state Division of Career and Technical Education electronically score the multiple-choice component of the exam. Scoring of the performance based constructed response scenario of the assessment is performed by task force members in each skill standard area, who use a scoring rubric that indicates performance levels. Scoring is double blind, with students required to obtain a score at or above 3 on a 4-point scale.

*How are testing results used?*
Test results are used for Perkins accountability purposes. Kentucky measures CTE skill proficiency based on the number of students earning a certificate relative to those taking the exam. In some instances, industry organizations are endorsing the state standards and calling for their members to recognize the value of the state standards and assessments. Students who have received certificates have also been featured in industry newsletters and magazines.

**Lessons Learned**
A state official thinks the process Kentucky has been using to implement the assessments has been a good one. Their teachers have "grown tremendously" in understanding the importance of having current, aligned curriculum.

She stated it has taken a lot of hours from outside partners to make the assessments possible and that it is important to have these partners involved in every step because they help identify the standards that Kentucky employers want and are looking for.

She also stated there are many things they could do to improve their assessments but that it's not possible due to budget restrictions. In particular, they could do more to test the reliability and validity of the questions. She said they had thought about outsourcing before but again it is not possible due to budget constraints.

**Contact**

Pamela Moore, Consultant. Kentucky Department of Education, Phone: 502-564-3775.

# NORTH CAROLINA

North Carolina assesses occupational skill attainment of CTE students using post assessments contained within its state developed VoCATS system. VoCATS is a comprehensive, competency-based, criterion-referenced computerized instructional management system. The system is designed to support CTE educators in planning instruction; assessing students before, during, and after instruction; evaluating student mastery of competencies; documenting student achievement; and providing accountability data.

## Assessment History

Standardized assessments have been used since 1990 to document student achievement in CTE courses. The system went statewide in 1992-93 and was used to provide data about student technical attainment required by federal Perkins legislation beginning around 1995. The statewide assessments are aligned to course blueprints that show exactly what objectives are to be covered. School systems also receive banks of assessment items aligned to the course objectives for use in interim testing.

*Why were assessments instituted?*

The VoCATS system was developed to support CTE educators in improving CTE instruction, documenting student gains, and demonstrating student competency mastery.

## Development Process

*Who participated in design/purchase?*

Teams of North Carolina teachers developed VoCATS materials with input from business and industry representatives. To date, hundreds of business representatives and local administrators, and thousands of teachers have been involved in development curriculum materials.

*How long did it take to develop/institute assessments?*

It takes about three years to develop a course, including the blueprint and the classroom and secure item banks. Once developed, courses are revised as needed, at least once every five years. During the revision process, there is one "field testing" year when data are not collected for state accountability purposes.

*What was the cost of developing state tests?*

Test development is imbedded in the state curriculum development effort and cannot be reported separately.

*Have new tests been added over time, and if so, why?*

Existing materials are continuously updated and new materials are developed as needed. For example, in the 2003-04 school year the state worked to validate and assess the reliability levels for student assessment measures contained in 64 course blueprints, aligned 5 courses with national curriculum standards, and developed 59 test item banks.

**Test Structure**

*What types of skills are assessed?*

VoCATS is a competency-based and criterion referenced instructional management system. Assessments are aligned with course blueprints that document the skills students need to know and be able to do in specific occupational areas. Classroom banks provide assessment measures for both cognitive and performance skills. Statewide post assessments assessed cognitive components only. A project is currently underway to incorporate performance measures in the state assessments.

*How many tests exist?*

As of Summer 2005, VoCATS curricular blueprints existed for 131 courses.

*How is local curriculum aligned to state assessments?*

Course blueprints lay out the framework of the curriculum for a given course. Included in the blueprint are the units of instruction, the core competencies in each unit, and the specific objectives for each competency. The blueprint illustrates the recommended sequence of units and competencies and the cognitive and performance weight of the objective within the course. Teachers use the blueprint to help in the planning of a course of work for the year, preparing daily lesson plans, and constructing instructionally valid assessments.

Teachers may also draw on 116 banks of assessment items that are distributed electronically, 100 curriculum guides, and a generation of secured post assessments for courses supported in the Programs of Study. Staff development is also available.

*What are the test components?*

Tests are course specific and are designed to assess specific occupational skills taught within a course. The state is currently considering adding a performance component to the state assessment process.

*Are state tests transferable?*

Classroom assessment banks are available to users in other states. However, these banks are aligned directly with course blueprints, so their use is not appropriate without modification of the curriculum. Secure state post assessments are not available outside of North Carolina.

**Test Administration**

*Which students take tests?*

All high school CTE teachers use VoCATS as an assessment tool on an ongoing basis for pretests, interim tests, unit tests, 9-week tests, midterms, etc. All LEA are using VoCATS-designated software and 95 percent of all high schools and many elementary and middle schools have computer hardware to run this software. In addition, all CTE students are to take the state assessments unless the student has an IEP that calls for alternate testing. In the 2003-04 program year, post assessment data were reported for 298,438 of the 388,766 students identified as enrolled in CTE courses for which there were end-of-course tests. Currently the state is working on ways to increase the number of students for whom data are reported and to collect data for students who take alternate tests.

*When are tests administered?*

Interim tests are administered on an ongoing basis throughout the school year. Post assessments are administered at the end of each term.

*Who pays for the assessment?*

Curriculum development occurs at the state level using Perkins funds. Development of tests is imbedded in the curriculum development system and is difficult to separate out. A very rough estimate is that the state spends about $100,000 annually on the testing effort, including development of test items, validation and reliability testing, creation of tests, development of manuals used in testing, and electronic duplication. Local systems pay for duplication of hard copies of the tests and purchase software necessary for system operation.

*How are testing results used?*

Local school systems use the data to develop strategies to improve student attainment of technical competencies. Post assessment results are reported to the federal government for Perkins accountability purposes, and to the North Carolina State Board of Education.

**Contact**

Rhonda Welfare, VoCATS Consultant. North Carolina Department of Public Instruction–Secondary Education. Phone: 919-807-3876.

# Utah

Utah uses state-developed, end-of-program assessments to assess the occupational competency of CTE concentrators. In some program areas, end-of course assessments are also available.

## Assessment History

*When were assessments instituted?*

In the late 1980s, the Utah Department of Education piloted competency testing in limited courses in Business. These were production tests.

In 1995, the Utah State Legislature determined that up to 20 percent of Applied Technology funding would be allocated based on student performance. In 1995 the state recognized, where appropriate, national exams and began developing end-of-course tests with performance assessment done in the classroom and a state objective multiple-choice test. Since that time, competency based testing has become an integral part of the state's CTE curriculum. As part of the 1995 initiative, 10 percent of CTE funding was earmarked for distribution though the state Skill Certificate program. In 1997, this percentage increased to 12 percent for incentive funding.

*Why were assessments instituted?*

The primary purpose of the state's assessment system is to improve CTE program curriculum and instruction though the use of performance-based incentives. The Skill Certificate program is also used to report CTE skill attainment for the federal Perkins accountability system.

## Development Process

*Who participated in design/purchase?*

State CTE administrators have taken the lead in developing statewide assessments. They have been assisted by testing consultants, district directors, and a state committee that provides oversight and guidance.

*How long did it take to develop/institute assessments?*

In 1995 state CTE administrators approached the State Legislature and requested additional funding for CTE; legislators agreed to provide additional funding, but tied resources to performance. In particular, the legislature stipulated that the state implement a CTE testing program and use the results to award up to 20 percent of Applied Technology Education funding based on student performance. Over time, competency based funding has grown to become an integral part of the CTE curriculum. .

A first step in the test development process entailed identifying state CTE standards for each program area. To do so, the state consulted national standards and consulted with industry representatives and teachers to identify a set of objective statewide standards.

*What was the cost of developing state tests?*

Data on the initial cost of test development is not available. The state has used teacher teams to develop exams, and test item revision is an ongoing process.

*Have new tests been added over time, and if so, why?*

Assessments have been added over time to address new areas. The state also conducts annual test-item analysis, revising tests as necessary.

The state also pilot questions that are not counted in the student's score, but are used to continually update the test item data bank from which the multiple-choice questions are drawn.

**Test Structure**

*What types of skills are assessed?*

State CTE Skill Certification Tests are organized by program area, around a distinct set of occupationally specific skills. In some program areas, multiple assessments have been developed to assess students with different levels of skill. For example, the state offers three assessments in the Drafting program area, corresponding to beginning, intermediate, and advanced skills.

*How many tests exist?*

Tests are offered in all CTE program areas, including Agricultural Education, Business Education, Family and Consumer Sciences, Health Science & Technology Education, Marketing Education, Technology Education, Trade & Technical, and Information Technology. As of 2005, the state had developed 133 state exams and identified 25 national industry developed and licensure certification exams.

*How is local curriculum aligned to state assessments?*

Standards and objectives have been developed for each test in the assessment system. Standards are broad statements by category of knowledge and skills that describe what students should be able to do. Objectives are sub-standards or competencies included within a standard. Test questions on both the multiple choice and performance assessments are written to measure the attainment of an objective within a standard.

*What are the test components?*

Students must pass both a performance assessment and a multiple-choice exam to qualify for a certificate. This aspect of combining the performance and objective performance has been in place for about five years. Before this time each program area had its own criteria.

Performance assessments are administered in class and evaluated by a student's teacher prior to the multiple-choice exam. All performance objectives must be completed and evaluated prior to the written test. To pass the performance exam, student must achieve a level of 'moderately' to 'highly' skilled on all performance objectives included in the performance assessment. Each element within the performance assessment is tied to a standard and objective from the course. Students may take the performance assessment at any time during the course, and may repeat the objectives until they are judged to perform at the required level.

Skill Certificate program tests are multiple-choice, consisting of up to 80 questions with four possible answer choices. Each test item is linked to a single standard and objective, which is used for scoring, reporting and program improvement purposes. While each question is counted equally for scoring purposes, particular standards may be weighted more highly though the use of additional questions tied to that standard.

*Are state tests transferable?*

Since state assessments align with the state's CTE performance standards and competencies, it is unlikely that the state exam can be readily transferred to other states.

**Test Administration**

*Which students take tests?*

Participation in the Skill Certification program is voluntary; however, all districts within the state participate in the program. This is due, in part, to the incentive funding tied to student performance: districts that achieve higher success rates can qualify for additional funding. In the 2003-04 school year, over 165,00 students participated in the assessment program.

*When are tests administered?*

Tests are designed to be taken at the end of a course and are administered at the end of each trimester or semester. The state has a one to two day turnaround time on scoring.

*Who pays for the assessment?*

The Utah State Office of Education developed tests that are provided to students free-of-charge. In some cases, typically involving licensure exams, students may be required to pay for the exam and licensure. The state pays for the testing program using Perkins funding and by assessing participating districts a fee for services. The annual cost of statewide testing is roughly $400,000 per year, with half of funds coming from Perkins and the remaining amount from districts.

*How are testing results used?*

Program test results are used to award incentive funding to districts based on the number of students who earn a certificate by receiving a substantial score, 80 percent, on both the performance and objective tests. Outcomes are also aggregated and reported to the U.S. Department of Education for federal accountability purposes.

Although the assessment system is not a formal certification program, students can use their certificates as evidence of their accomplishment when applying for employment or further education and training.

**Contact**

Renee Hyer, Skill Certificate Program Specialist. Utah State Office of Education, Career and Technical Education. Phone: 801-538-7853.

Appendix E:

# Profiles of State Using State-Developed, End-of-Program Assessments

---

Wyoming

## Wyoming

Wyoming monitors the skill attainment of CTE concentrators using the Wyoming Career Technical Assessment (WyCTA), an electronic, state-developed testing program designed to objectively assess whether students master a broad set of academic and technical work readiness skills common to all CTE programs offered in the state. Some scenarios also ask students to perform some program specific skills, such as setting up equipment to perform a task. Students are assessed based on performance: at the beginning of the testing period students (or groups of students) are provided with a scenario that they are asked to solve within a given time period. A trained evaluator, who uses state-developed testing rubrics and grading procedures to assess student performance, rates student performance.

### Assessment History

*When were assessments instituted?*

The first iteration of the WyCTA was developed in approximately 1992 to respond to the accountability provision contained in the 1990 Perkins Act, which required states to develop accountability systems for secondary and postsecondary vocational education programs. Due to the cost associated with other testing systems, such as ACT's Work Keys program, the state collaborated with the National Center for Research in Vocational Education to develop a performance-based assessment. The assessment was revised in 2002 to align with newly developed state CTE standards. To facilitate this alignment, the State contracted with V-TECS to assist in redesigning the testing rubrics to align with newly identified content standards.

*Why were assessments instituted?*

The assessments were initially instituted to respond to federal Perkins reporting requirements. The assessment approach adopted was intended to take into account three issues:

Cost: To avoid recurring costs associated with test administration of program specific assessments (e.g., WorkKeys), the state sought to develop a single exam that could be administered by districts without charge.

Instructional Time: Rather than have to take time out of the instructional day to support testing, the state opted for an authentic testing approach that could be incorporated into the school day. Students would also have an opportunity to learn from the testing program, rather than have to simply respond to questions testing their knowledge.

Local Control: Wyoming is a rural state with a tradition of local control over curriculum and assessment. Although the WyCTA prescribes a testing approach, local educators have some flexibility in how it is administered and scored.

### Development Process

*What was the framework for development?*

The original WyCTA was designed to assess skills identified in the influential 1991 SCANS report, *What Work Requires of Schools: A SCANS Report for American 2000*¸ published by the

Secretary's Commission on Achieving Necessary Skills, as well as recommendations in the National Career Development Guidelines, developed by the National Occupational Information Coordinating Committee (NOICC) in 1989. All necessary skills found in the SCANS were assessed in the original WyCTA, and continue to be addressed in the revised exam.

In 2000-2001, the state began a process to develop formal CTE content and performance standards. Regional meetings were convened where participants compiled drafts using local district standards. The state committee, consisting of regional representatives, then used the regional documents to draft the state standards. National standards and several states' standards were referenced to establish the rigor of the Wyoming Career/Vocational Education Content and Performance. In 2002-2003 the standards were reviewed and revised. The WyCTA was revised subsequent to standard identification and adoption.

*Who participated in design/purchase?*

Regional groups consisting of representatives from each of the districts participated in WyCTA development. Community college, universities, students, and business representatives also contributed ideas to the design process.

*How long did it take to develop/institute assessments?*

The WyCTA was planed to include training and dissemination that took approximately two school years to implement. It has been continuously reviewed and updated as necessary.

*What was the cost of developing state tests?*

Initial costs were related to the development of the aligned rubrics used to develop scenarios. The cost in the design and alignment was approximately $20,000. The WyCTA is scheduled for upgrade upon reauthorization.

*Have new tests been added over time, and if so, why?*

The WyCTA assessments are not secure, meaning that the state will need to draft additional scenarios over time. To maintain the quality of assessments, the state analyzes the internal consistency reliabilities (Cronbach's Alpha) and inter-rater reliabilities of assessment rubrics. Validity is assessed in a number of ways: 1) face validity by experts in the area of CTE education who helped design and continually improved the assessment; 2) factor analyses demonstrate that the assessment areas are measuring the constructs of interest; and 3) concurrent validity was established through a study in which the WyCTA results were correlated to the ACT Work Keys

**Test Structure**

*What types of skills are assessed?*

State Career/Vocational Standards specify what students must master. They are not instructional curricula or technical documents used by teachers to guide day-to-day instruction. Teachers ensure that students achieve the career/vocational standards by using a range of instructional strategies that they select based on their students' needs. All state standards are identified for grades K-4, 5-8, and 9-12 with benchmarks at grades four, eight, and eleven. These standards have been organized into six major strands:

1. Resources: Students effectively manage time, money, materials, facilities and human resources.
2. Interpersonal Skills: Students acquire and demonstrate interpersonal skills necessary to be successful in the workplace.
3. Information: Students acquire and use workplace information.
4. Systems: Students demonstrate an understanding of how social, organizational and technological systems work.
5. Technology: Students demonstrate the ability to use a variety of workplace technologies.
6. Careers: Students develop skills in career planning and workplace readiness.

The strands were modeled after the Secretary's Commission on Achieving Necessary Skills (SCANS) and the National Career Development Guidelines. The graduating class of 2006 will be required to meet these as well as all state standards for language arts, math, social studies, science, health, physical education, foreign language and fine and performing arts.

An alignment of performance assessment areas within the WyCTA to the career/vocational standards are directly linked to specific content standards areas. The WyCTA is also compatible with the performance assessment components of the benchmarks. Assessment alignment with state standards is a critical component of state accreditation and future graduation requirements.

*How many tests exist?*

The state has developed a set of 18 scenarios. Each scenario aligns with a different content standard and benchmark, and each offers students an opportunity to demonstrate their mastery of a skill component and sub-skill area. It is not expected that all of the Performance Assessment Criteria will be used to assess all Standards. The scenarios are structured to measure progress against the Content and Performance Standards, using the specific Performance Assessment Components and Sub-skills that can be linked with the standards.

*How is local curriculum aligned to state assessments?*

Wyoming's CTE standards specify general skills students are expected to perform. They are not intended to serve as either instructional curricula or technical documents to guide day-to-day instruction; rather, teachers are expected to help students achieve the state standards by offering differentiated instructional strategies selected based on their students' needs.

The WyCTA is directly aligned to the state CTE standards, and has been updated as changes in programming and data collection are made. The exam is also compatible with the performance assessment components of the benchmarks. Consequently, local instructors that incorporate the skills contained in the state content standards are preparing their students for WyCTA assessment.

*What are the test components and how are they administered?*

The WyCTA consists of performance rubrics covering six content areas: Communication, Applied Math, Affective and Thinking, Technology, Pre-Employment, and Employability. Within each of these content areas are sub skills for actual rating purposes.

State assessment is performance based: students are rated based on their ability to demonstrate skills specified in a set of statewide rubrics. Students are judged on their performance by educational staff who are trained to serve as WyCTA evaluators, and who are able to observe

students throughout the school year. Whenever possible, CTE instructors are the first choice to serve as raters, although academic instructors, guidance counselors, etc., may also serve as raters.

Evaluators are provided with a standardized set of rubrics, rubric instructions, and a set of sample prompts. Evaluators use these rubrics to assign a rating to students on each WyCTA sub skill area, based on observations that the evaluator makes in the classroom or other work situation throughout the academic year. Students have between one to two weeks to complete their assigned problem. All student ratings using the WyCTA performance rubrics must be completed as of April of the current school year. In addition to rubrics and prompts, portfolios, projects, and written assessments may be included for use in triangulating ratings.

*Are state tests transferable?*

The WyCTA assessment is a performance-based exam that is directly aligned with state CTE standards. Skill assessment focuses on broad, occupationally generic work readiness skills common across all program areas. While it is likely these skills can be identified in all CTE programs, Wyoming tailored its content standards to reflect state-identified needs. As such, it is unlikely that the state's assessment system could be transferred without substantial changes made to the content standards, performance rubrics, and rubric instructions.

**Test Administration**

*Which students take tests?*

The WyCTA is administered to all CTE students in 10th grade (i.e., those who have taken at least 2 semester courses) and all CTE concentrators in the 11th and 12th grades (i.e., those who have taken 3 or more semester courses in a vocational program.

*When are tests administered?*

Testing occurs throughout the school year, with administration completed by April. Although most scenarios are designed for administration in a one or two-week period, a large project may, at the discretion of the instructor, be broken into parts or administered over a longer period of time. Alternatively if students work together on a problem as a team, project work may take less time than stipulated in the rubric. Scenarios are not intended to be time sensitive.

*Who pays for the assessment?*

There is no charge associated with testing. Local district and school staff administer the assessment and enter data into an electronic database. The WDE contracts with PRES Associates Inc., located in Jackson, Wyoming, to assess the reliability and validity of the CTE assessment and to collect and run the analyses on the raw data that are compiled annually.

*How are testing results used?*

WyCTA assessment scores are obtained from all local education agencies on an annual basis to monitor and evaluate instructional activities. The 10th grade data are used for district monitoring and for program improvement for students still in school. Data from the 12th grade are used for federal reporting and state improvement purposes.

**Contact**

Mariam Manley, President, Pres Associates. Phone: 301-733-3255.

Philip Trujillo, Perkins Competitive Grant Consultant. Wyoming Department of Education, Career and Distance Education–Data & Technology Services. Phone: 307-777-6808.