Site Action Planning Workbook for *Technology Centers That Work (TCTW)*

Southern Regional Education Board
592 Tenth Street NW
Atlanta, GA 30318
Phone: (404) 875-9211
Fax: (404) 872-1477
http://www.sreb.org

Primary *TCTW* Goals for Continuous Improvement

The mission of *TCTW* is to create a culture of high expectations and continuous improvement in high school. To achieve this mission, *TCTW* has several goals:

- Increase to 85 percent the percentages of career/technical students who meet the *TCTW* reading, mathematics and science performance goals on a National Assessment of Educational Progress (NAEP)-referenced exam.

- Increase the percentages of career/technical students who perform at the Proficient level to at least 50 percent in reading, mathematics and science, as measured by the NAEP-referenced *TCTW* Assessment.

- Increase the percentages of technology center graduates who complete a career/technical concentration and enter employment within the field for which they were prepared and who enter postsecondary studies.

- Increase to 95 percent the percentages of high school students who enter the technology center in grade 11 and graduate on time.

- Advance state and local policies and leadership initiatives that sustain a continuous school improvement effort.

- Work with middle schools to effectively use EPAS assessments to guide students in creating programs of study that consist of courses that prepare students for high school and technology center courses.

- Increase annually the percentage of students leaving the technology center with postsecondary credit or having met standards for postsecondary studies, so they will avoid remedial courses.

- Work with the high schools to annually increase the percentage of students entering technology centers prepared and qualified to earn college credit based on PLAN test scores.

- Increase annually the percentage of technology center high school graduates that pass an improved employers exam. (National licensure, state exam/credential, etc. such as ASE)

TCTW Key Conditions for Accelerating Student Achievement

High Schools That Work believes everyone — teachers, high schools, districts, technology centers, local and state leaders — must work together to align policies, resources, initiatives and accountability efforts to support high schools and technology centers as they adopt and implement comprehensive school improvement designs. The *TCTW* Key Conditions include the following:

- **A clear, functional mission statement:** Technology centers need a clear, functional mission statement to prepare students for challenging secondary studies and for success in postsecondary education and the workplace.

- **Strong leadership:** Each technology center and home high school needs strong and committed leaders to improve, align and benchmark curricula to high standards, to improve the quality of instruction and to raise student achievement in grades 10 through adulthood. At each technology center, create a leadership team consisting of the campus director, assistant director, counselor and teacher leaders. School and district teams participate annually in a series of leadership development workshops aimed at more fully implementing the *TCTW* design.

- **Plan for continuous improvement:** Technology centers and site leaders need to create an organizational structure and process that ensures continuous involvement with faculty on what to teach, how to teach it, what students are expected to learn, how to assess what they have learned, and how faculty relate to each other, to the students and to the home high school, family and community.

- **Qualified teachers:** Technology center teachers have in-depth knowledge of their program/content areas and of teaching strategies appropriate to students' needs for success. Alternatively certified technology center teachers lacking certification/BS degree in their program/content areas are supported by the technology center to acquire them. The technology centers employ teachers who have program/content area depth and support them in learning how to teach effectively.

- **Commitment to goals:** School leaders and teachers are committed to achieving the *TCTW* Goals and implementing the Key Practices. School boards are committed to having all students complete a career/technical concentration and a rigorous academic core. Continuous review of local policies and practices ensures that a strong message of high expectations is sent to the school administration, faculty/staff and the home high school.

- **Flexible scheduling:** Technology center superintendents and school boards work with home high schools to adopt flexible schedules enabling students to attend technology centers, earn college credit and certifications, and complete an upgraded academic core.

- **Support for professional development:** Technology center leaders provide teachers with instructional materials, planning time and professional development for implementing new curricula and research-based instructional methods.

TCTW Key Practices for improving student achievement

TCTW has identified a set of Key Practices that impact student achievement. Following are the *TCTW* Key Practices that provide direction and meaning to comprehensive school improvement and student learning:

- **High expectations** — Motivate more students to meet high expectations by integrating high expectations into classroom practices and giving students frequent feedback.

- **Program of study** — Require each student to complete a plan of study leading them to complete a true concentration of an approved sequence, including at least four career/technical courses and an upgraded academic core leading to better postsecondary preparation for postsecondary studies.

- **Academic studies** —Teach more students the essential concepts of the college-preparatory curriculum by encouraging them to apply academic content and skills to real-world problems and projects within their career and technical studies. School leaders need to:

- Align career/technical courses to essential state, national, academic and career/technical standards that prepare students for postsecondary studies and careers.

- Align core academic courses to essential state and national standards that prepare youth for postsecondary studies and careers.

- Align student assignments, student work and classroom assessments to at least the Proficient-level standards as measured by a NAEP-referenced exam, state assessments and employer recognized exams.

- **Career/technical studies** — Provide more students access to intellectually challenging career/technical studies in high-demand fields that emphasize higher-level mathematics, science, literacy and problem-solving skills needed in the workplace and in further education. School leaders need to:

    - Create new courses blending academics and technical content, using applied teaching methods and new measures of academic and technical proficiency.

    - Develop standards, conditions and agreements for awarding postsecondary credit in high-demand career/technical fields to high school students.

    - Require senior projects with academic, technical and performance standards. (Capstone)

    - Provide students opportunities to work toward a recognized employer certification.

    - Provide students opportunities to earn college credit through dual enrollment in career/technical courses.

- **Work-based learning** — Enable students and their parents to choose from programs that integrate challenging high school career/technical studies and work-based learning and are planned by educators, employers and students.

- **Teachers working together** — Provide teams of teachers from several disciplines the time and support to work together to help students succeed in challenging career/technical and academic studies. Integrate reading, writing and speaking as strategies for learning into all parts of the curriculum and integrate mathematics and science into career/technical classrooms. School leaders need to support

    - career/technical and academic teachers in engaging students regularly in reading books and articles, writing, making presentations, and using high-level reasoning and thinking skills.

    - career/technical, mathematics and science teachers working together to better align and integrate mathematics and science concepts and skills into assignments in career/technical classrooms.

- **Students actively engaged** — Engage students in career/technical and academic classrooms in rigorous and challenging Proficient-level assignments using research-based instructional strategies and technology.

- **Guidance** — Involve students and their parents in a guidance and advisement system that develops positive relationships and ensures completion of a career/technical concentration with an approved sequence of at least four courses and an accelerated program of study. Provide each student with the same mentor throughout high school to assist with setting goals, selecting courses, reviewing the student's progress and suggesting appropriate interventions as necessary. School leaders need to:

    - Hold a meeting with students, parents and their mentors annually at a technology center to review progress and develop plans for the next year.

    - Develop efforts to educate middle grades parents, school and teacher leaders, and students about the achievement level needed for challenging high school and career/technical studies and to educate high school parents, students and teachers about the achievement level needed for postsecondary study and high-demand, high-income jobs.

- **Extra help** — Provide a structured system of extra help to assist students in completing accelerated programs of study with high-level academic and technical content. School leaders need to:

    - Support all career/technical students to become independent learners by giving them opportunities to practice the habits of successful learners, such as study and literacy skills, time management and cooperative learning.

    - Give students easy access to opportunities to meet course standards and graduate on time with their peers.

    - Support teachers in forming nurturing relationships with career/technical students aimed at improving students' work and achievement.

    - Establish a system to analyze student progress on technology center standards and provide remediation focused on career/technical skills to ensure students can pass both hands-on performance and written certification exams.

    - Plan catch-up learning experiences for entering technology center students who are not prepared for career/technical and college-preparatory courses.

    - Work with postsecondary institutions to identify 11th-grade career/technical students not ready for postsecondary study. Develop special strategies to get these students prepared.

- **Culture of continuous improvement** — Use student assessment, program evaluation data, technology center performance reports, program enrollment, retention and placement reports, college remediation reports, student follow-up reports and advisory committee input to continuously improve school culture, organization, management, curriculum and instruction to advance student learning.

The *TCTW*-recommended curriculum

The centerpiece of *TCTW* is a challenging curriculum focused on preparing high school students for further education and the workplace. To complete the recommended curriculum, each student takes the following:

- at least **four English courses**, with the content and performance standards of college-preparatory English that emphasize reading, writing and presentation skills. Students should read the equivalent of eight books annually, write short papers weekly and write one or more research papers annually. Students revise work until it meets standards.

- at least **four credits in mathematics** including Algebra I, geometry, Algebra II. A fourth higher-level mathematics course or a specially developed mathematics course designed to prepare students for postsecondary studies is strongly recommended. This will help 11th-graders who are unprepared for college-level studies avoid remedial college mathematics.

    - Students completing Algebra I in grade eight will be required to complete three additional years of mathematics.
    - Students take mathematics their senior year.
    - All career/technical courses focus on numeracy and literacy in the language of the technical area.

- at least **three college-preparatory science courses** — biology, chemistry, physics or applied physics, or anatomy/physiology. Students conduct lab experiments and investigative studies; read, critique and discuss three to five books or equivalent articles about scientists, scientific discoveries and how science is used in the real world; keep lab notebooks; make presentations; and complete research projects and written reports. Students design and conduct group or individual projects. *TCTW* recommends that schools using block schedules require four years of science.

- at least **three college-preparatory social studies courses** emphasizing reading and writing to learn. Students will read five to eight books or equivalent articles, write weekly, make presentations, complete research projects, and prepare at least one major research paper in each course.

- at least **one computer course** or demonstrated proficiency in computer technology beyond simple keyboarding, which students should take early in high school to be prepared to use computer-based technical skills in other classes.

- at least **four credits in a concentration** that consists of an approved sequence of career/technical courses. Each student will have a choice from at least four career/technical concentrations in career cluster pathways at school sites, work sites, career/technical centers, postsecondary institutions; and a blended concentration, such as mathematics/science/technology or humanities and business studies. Each concentration will include one or two Advanced Placement (AP), International Baccalaureate (IB) or dual credit courses.

How does your tech center rate?

Take a few minutes to check the column that best fits the concepts and instructional practices that provide the foundation for your students.

CONCEPTS OF QUALITY CAREER/TECHNICAL EDUCATION

Old Beliefs		New Beliefs	
Stand-alone programs taught occupational skills for specific jobs.		CTE is part of a total program of academic and technical studies that prepares students for continued learning in work or educational settings.	
Students taught in low-level related academic courses		Students expected to complete high-level academic courses	
All content needed for career taught by a CTE instructor		CTE and academic teachers work as an instructional team	
Programs focused on preparing students for entry-level jobs		Programs focused on preparing students for further learning and a career pathway	
Program success measured by number of students who entered a specific occupation right after high school		Program success measured by number of students who make a successful transition to work, further study or both	
CTE is equated with less able students		CTE is part of the education of many students with a wide range of abilities	
CT educators "accommodate" many students by setting low standards		CT courses have challenging, clearly defined goals that all students are expected to achieve	
CTE is an elective		All students either complete an academic or career major	
Academic educators view CTE as a way to teach occupational skills to students who could not succeed in academic courses		Academic and CT educators work together to help students learn high-level academic and technical concepts	
Emphasis on learning procedural skills and following directions—students dependent on someone else to do the thinking		Emphasis is on helping students become independent learners who can think through problems and find solutions	

Source: A Guide to Preparing a Syllabus: Designing Challenging Vocational Courses, SREB, 1997.

CTE INSTRUCTIONAL PRACTICES

Old Approach		New Approach	
Instruction focuses on procedural skills		In addition to learning procedural skills, students are given open-ended problems requiring the use of technical, academic, cognitive and personal skills	
CTE teacher handles the majority of the instruction		CTE and academic teachers work together	
Students follow a set of steps to complete assignments		Students are given open-ended assignments that require them to do research and to prepare their own steps for completing them	
Instruction takes place in the classroom or laboratory		Classrooms, laboratories, business and industry, the home and the community are all locations for instruction	
Content is determined by what the instructor likes to teach or the students want to learn		All students must learn a core set of major competencies (knowledge and skills)	
Standards vary according to each student's perceived ability		All students are expected to meet the same high standards	
Assignments do not require students to use academic and thinking skills		The teacher uses activities and problems that require students to integrate and use multiple academic and technical competencies	
The teacher assumes student learning through informal observations or performance and written tests		Assessment is continuous, using a wide variety of techniques that focus on standards	
All assessment is done by the teacher		Students evaluate their own work based on the definition of quality learning that they have developed with their teacher before submitting it for the teacher's review	
Assessments are conducted primarily for assigning grades		The purpose of assessment is to help students and instructors improve, as well as to determine grades based on standards	
Students get one chance to learn the content before they are graded		Students are given multiple opportunities to learn the content. They may be expected to use their own time to meet quality standards	
Students are not expected to work outside of class		Students are expected to work on assigned projects outside of class	

Source: A Guide to Preparing a Syllabus: Designing Challenging Vocational Courses, SREB, 1997.

Changes Schools Can Expect – Ideal Process for Implementing the *TCTW* Design

Structural Changes	Instructional Changes	Support Changes	Leadership Changes
▪ **Adjust the Master Schedule –** annually to increase the percentage of students enrolled in college preparatory courses by at least 20 percent. ▪ **Expand Student Access to Quality Career/Technical Studies –** through partnerships with employers and postsecondary institutions ▪ **Expand Dual Credit and Advanced Placement Offerings Each Year –** by training teachers annually and offering new courses ▪ **Organize into career-**based small learning communities around a rigorous academic core/	▪ **Literacy Across the Curriculum** – prepare all teachers to use reading and writing to learn strategies ▪ **Numeracy Across the Curriculum** – Establish plans to increase student use of mathematical skills and processes in all content areas – with special emphasis in science, career/ technical courses, physical education and athletics ▪ **Integrating Academic and Career Studies** – Establish common units of study that link academic content with real world opportunities ▪ **Project-based Learning** – Develop high-level project-based assessments ▪ **Research-based Instructional Strategies** – prepare teachers to use strategies that actively engage students in relevant learning experiences ▪ **Curriculum Alignment** – Align instruction to state standards through development of a curriculum framework, course syllabi, common end-of-course exams and units of study ▪ **Developing Students as Self-directed Learners** – Instruction to develop study skills provided through a support class or integrated into ninth -and 10th - grade courses ▪ **Teacher Assignments and Assessments** – Develop a process to provide teachers with frequent feedback on a review of assignments, student work and assessments to determine if they expect students to learn at the proficient level	▪ **Development of a Ninth -grade Support Program** - for students entering high school lacking skills for success. ▪ **Extra Help Program** – Program that ensures all students having a grade below "B" have access to and receive help. ▪ **Guidance Program** – Program that ensures every student has an adult advocate at the school who meets with the student to develop and annually review a four-year plan for success. The program also involves frequent monitoring of student progress by the adult advocate who keeps parents involved and informed. ▪ **Credit Recovery Program** – A process to allow students to make up failed courses in a timely manner so they may graduate on-time. ▪ **Support for Teaching and Learning** – A process to develop school leadership teams who support efforts to improve instruction through development of demonstration classrooms, peer coaching, walkthrough observations and strategies to assist teachers in making the various changes outlined here.	▪ **Development of a leadership team to**: ▪ involve all faculty in the change process ▪ create a culture of high expectations in the school ▪ build consensus for a need to change within a school ▪ move standards into the classroom to get students to create proficient-level work ▪ support efforts to focus on literacy ▪ support efforts to focus on numeracy ▪ **Prepare master teachers** - to become teacher leaders ▪ **Engage the Faculty in Continuous School Improvement –** by organizing a school improvement team and school wide leadership teams around curriculum and instruction, professional development, evaluation, guidance and transitions.

Recommended Plan for *High Schools That Work* Plan for Implementation - Year 1

Area	Planning	Implementing	Reviewing/Refining
Structural	▪ Actions to create a culture of raised expectations within the school ▪ Actions to increase the percentages of students completing the *TCTW-r*ecommended core and a concentration ▪ New master schedule that increases the percentages of students in advantaged curriculum ▪ Increase in AP offerings and develop links to expand dual credit offerings	▪ Interdisciplinary *TCTW* leadership teams within to plan actions for continuous improvement ▪ Increase in senior year expectations (multiple formats) ▪ Phase out 20 percent of low- level course sections to push students to a higher level	▪ School and Classroom Practices via the *TCTW* Technical Assistance Visit, *TCTW* Assessment and *TCTW* Ninth -grade Survey ▪ Master Schedule ▪ Current School Improvement Plans
Instructional	▪ Development of a literacy plan using *TCTW's* Literacy Goals ▪ Development of a numeracy across the curriculum plan that integrates mathematics, science, CT, PE and athletics ▪ Process for teachers to analyze teacher assignments, student work and assessments ▪ Curriculum mapping in all core areas and career/technical courses	▪ Literacy instructional strategies across the curriculum ▪ Research-based instructional strategies that actively engage students to complete challenging assignments ▪ Upgrade mathematics teachers' content knowledge and instructional methods (as needed)	▪ Instruction via walkthrough observations by school and district leaders aligned to professional development ▪ Analyze teacher assignments, student work and classroom assignments against the proficient level.
Support	▪ Advisor-advisee program that will involve faculty, students and parents ▪ Extra Help Program for all students not meeting standards ▪ Prepare teachers for ninth-grade catch-up courses	▪ Actions to communicate plans to students and parents in a clear manner ▪ Provide students with frequent feedback on progress in reaching proficient level work	▪ Development or revision of program of study booklet ▪ Involvement of parents in the scheduling process
Leadership Development	▪ Develop leadership team procedures for overall school	▪ SREB's Leadership Modules: o Creating a Culture of High Expectations o Using Data to Lead Change	▪ Involvement of entire faculty in the improvement process

Recommended Plan for *High Schools That Work* Plan for Implementation - Year 2

Area	Planning	Implementing	Reviewing/Refining
Structural	▪ 12th grade transition program designed around three dimensions: o Getting almost all students ready for college o Special programs for students planning to go to college but not yet prepared o Employer certification programs for students not planning to go to college ▪ Continuous efforts to raise expectations for all students	▪ Ninth- grade program including catch-up courses ▪ Actions to increase the percentages of students completing *TCTW* recommended core and a concentration ▪ Master schedule that phases out 20 percent of low- level course sections to push students to a higher level ▪ Implement new AP course offerings and expand dual credit offerings	▪ Interdisciplinary leadership team effectiveness ▪ Senior-year expectations and current graduation requirements ▪ Implementation impact of pushing more students into advantaged curriculum
Instructional	▪ Project-based learning focus ▪ Improving the quality of CTE instruction through integration of academic, career/technical instruction and improvement of project-based learning opportunities. ▪ Curriculum Mapping in two core academic areas	▪ Implement school-wide literacy plan ▪ Implement numeracy across the curriculum plan that integrates mathematics, science, CT, PE and athletics ▪ Research-based Instructional Strategies ▪ Process for teachers to analyze teacher assignments, student work and assessments to determine if they reach proficiency ▪ Curriculum mapping for two core content areas	▪ Teacher use of literacy strategies to engage students in classrooms ▪ Teacher use of research-based instructional strategies that actively engage students ▪ Quality of mathematics instruction
Support	▪ Preparation of teachers to teach new senior transition courses to prepare students for postsecondary study and careers ▪ Develop students as self-directed learners curriculum ▪ Prepare teachers to teach new AP course offerings	▪ Adviser-advisee program that involves students, faculty and parents with frequent feedback and communication ▪ Extra Help Program for all students not meeting standards ▪ Implement new ninth grade catch-up courses	▪ Communication procedures to students and parents ▪ Feedback procedures for students on progress toward proficient-level work
Leadership	▪ Develop leadership teams for continuous improvement. ▪ Develop school wide school improvement coordinators	▪ SREB's Leadership Modules: o Prioritizing, Mapping and Monitoring the Curriculum o Literacy Leadership	▪ Effectiveness of leadership processes ▪ Change in the culture of expectations within school ▪ Processes to analyze data, establish goals and actions to meet them.

Recommended Plan for *High Schools That Work* Plan for Implementation - Year 3

Area	Planning	Implementing	Reviewing/Refining
Structural	▪ Enhanced collaboration with community/technical colleges and business/industry ▪ Expand collaboration with feeder middle grades to improve transition of students	▪ 12th grade transition program designed around three dimensions: o Getting almost all students ready for college o Special programs for students planning to go to college but not yet prepared o Employer certification programs for students not planning to go to college ▪ Efforts to raise expectations for all students ▪ Phase out 20 percent of low level course sections to push students to a higher level	▪ Ninth-grade transition programs ▪ Actions to increase the percentages of students completing *TCTW* recommended core and a concentration ▪ Quality of new AP offerings and effectiveness of dual credit offerings
Instructional	▪ Expansion of real-world learning opportunities o Work-based learning o Senior project development ▪ Curriculum mapping for CTE programs	▪ Literacy/numeracy and research-based Instructional Strategies ▪ Project-based learning focus ▪ Improve the quality of CTE Instruction through integration of academic and career/ technical instruction and improve quality of project–based learning activities ▪ Curriculum mapping for two core content areas ▪ Demonstration Classrooms	▪ Teacher use of literacy/numeracy strategies to engage students in the classrooms ▪ Teacher use of research-based instructional strategies that actively engage students ▪ Curriculum mapping process ▪ Processes for teachers to analyze assignments, student work and assessments to determine if they reach proficiency ▪ Effectiveness of demonstration classrooms and increase in teacher collaboration
Support	▪ Expand links with community support programs	▪ Teach new senior transition courses to prepare students for postsecondary study and careers ▪ Implement students as self-directed learners curriculum ▪ Teach new AP/dual credit course offerings	▪ Adviser-advisee program effectiveness ▪ Extra Help program effectiveness ▪ Ninth-grade catch-up courses effectiveness ▪ School and classroom practices via Technical Review Visit, *TCTW* Assessment and *TCTW* Ninth-grade survey ▪ Continual review of communication processes
Leadership	▪ Continuous improvement team revisits current plans ▪ Process to orient new staff to *TCTW* design. ▪ Literacy and numeracy coaches to support continued growth	▪ SREB's Leadership Modules: o Leading Assessment and Instruction o Numeracy Leadership	▪ Focus team effectiveness for continuous planning ▪ Leadership for curriculum, instruction and assessment

Career/Technical Teachers Who Ignore Academics Sell Their Students Short

by Gene Bottoms

Career/technical teachers who fail to make their students read the technical materials of the field, use mathematics to solve real-world problems, and perform thought-provoking, open-ended writing assignments in a team learning environment represent programs that are relics. Two recent publications, *The Skills Gap 2001*, published by the National Association of Manufacturers (NAM), and *Higher Skills: Bottom Line Results*, published by the Center for Workforce Preparation (CWP), indicate that teachers who fail to incorporate academics into their career/technical programs are selling their students short.

CWP reports that the modern workplace requires a new definition of literacy. A deficiency in vital workplace skills has led to a serious shortage of qualified workers that challenges businesses' productivity, quality and profitability. Most businesses have reorganized their efforts in a way that requires employees to work together in teams and to take on greater responsibilities than they have in the past. Employees at all levels are being required to perform tasks once performed only by managers or specialists. These changes necessitate employees with higher-level literacy skills, including:

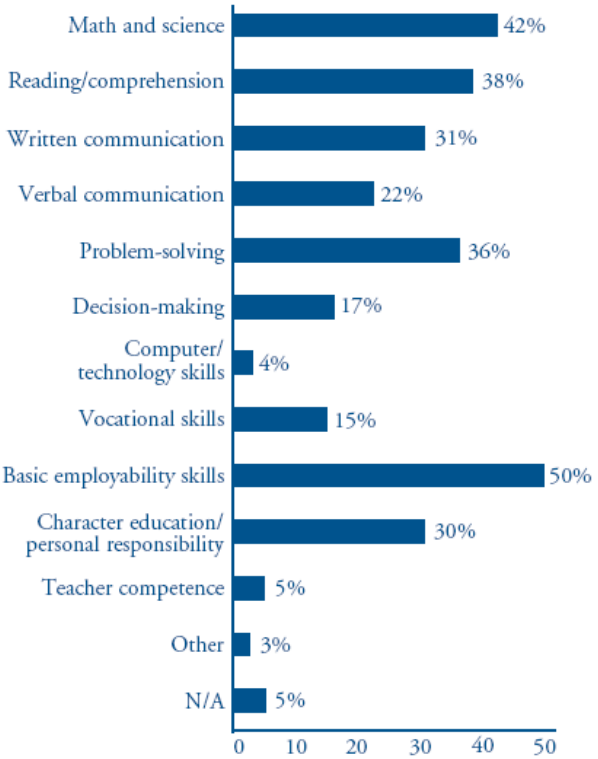
- basic skills such as reading, writing, speaking, listening and mathematics;
- higher-order skills such as reasoning, creative thinking, decision-making and problem-solving; and
- character traits such as maturity, responsibility and sociability.

A survey by the American Management Association reveals that 38 percent of job applicants lacked the reading and mathematics skills necessary to do the job for which they applied. Despite years of school reform efforts, this number doubled from the 19 percent reported in 1996.

A survey by the National Association of Manufacturers indicates a serious concern about the availability of qualified workers in the future as older workers retire. NAM recommends that the public education system work to increase standards and accountability and to produce graduates who are familiar with and prepared to meet the demands of the modern workplace in order to correct this alarming trend.

NAM reports serious deficiencies in current employees. Poor reading, writing, mathematics, communication, analytical and teamwork skills are among employers' foremost concerns. Career/technical teachers have the power to correct these deficiencies by changing what and how they teach. Incorporating strong academic requirements into career/technical programs will greatly enhance workplace literacy. If students are required to read the materials of the field, to write in the language of the field, and to use mathematics and reasoning to solve the problems of the field, they will be prepared to close the skills gap that concerns employers. To prepare students for successful futures, teachers must understand what industry demands, and they must adjust what they teach accordingly.

Greatest Deficiencies that Local K-12 Schools Have in Preparing Students for the Workplace*



*Each respondent selected up to three reasons.
Source: *The Skills Gap 2001*, National Association of Manufacturers

Academics Prepare Career/Technical Students for the Workplace and Continued Learning

by Scott Warren

"We can't make students read, write and do mathematics in career/technical classes, or they will drop out. Kids take our classes to do hands-on activities, not to read." Such statements — usually accompanied by disparaging remarks about the "quality of their students" — are heard all too often from some career/technical teachers. These teachers believe that their role is to prepare students for gainful employment, rather than to offer them a high-quality, well-rounded education. This approach serves neither the student nor the prospective employer.

Business and industry leaders report that they need applicants who can read and interpret information, who can apply mathematical skills to solve real-world problems, and who have the capacity to continually learn new skills and technologies. These are academic skills that career/technical students must learn in order to be successful beyond high school.

Teachers of quality career/technical programs have a system of instruction that requires students to read, write and use mathematics to complete assignments. They understand that students must have a strong academic foundation upon which to build professional success.

Many activities help prepare career/ technical students for the workplace and for a lifetime of learning. To enhance the quality of career/technical education, teachers must require students to:

- read articles related to the content area;
- read technical manuals;
- complete short writing assignments about the articles they read;
- use graphing calculators, spreadsheets and databases to solve real-world problems;
- research and write a paper related to their career/technical concentration;
- work together to create a project which will be assessed by community members from the appropriate industry; and
- master a comprehensive final exam demonstrating both career/technical and academic knowledge, including a technical literacy component aligned with industry standards.

These lofty goals require that career/technical teachers and academic teachers work together as a planning team. Many career/technical teachers will need to enlist support from academic teachers in developing and using rubrics to score assignments, in developing quality projects that link technical skills to academic content, and in incorporating high-level academics into their content areas. Academic teachers will work with career/technical teachers to learn ways to help students link academic content to real life.

This approach will raise both the academic and the technical achievement of students and will prepare students for postsecondary success that will last a lifetime.

Benchmarks for Raising the Bar in Career/ Technical Studies

Students report having to:

1. Read a career-related article twice a month and demonstrate understanding of the content.
2. Do two hours of mathematics homework weekly on a career-related mathematics problem.
3. Read technical manuals at least weekly to complete career/technical assignments.
4. Write to complete career/technical assignments at least weekly.
5. Use mathematics to complete career/technical assignments at least weekly.
6. Keep a folder/portfolio of a list of books or articles read, reports prepared and projects completed.
7. Use a database or spreadsheet to complete an assignment or project at least once a semester.
8. Meet standards on a written exam to pass the course.
9. Prepare a written report or complete a research study at least once a semester.
10. Take a technical literacy exam developed by state or industry leaders in a career/technical field of study with scores counting as a portion of the student's final course grade.

Sample Senior Project Topics by Career/Technical Concentration

- ***Agribusiness***
  - Cost-effectiveness of alternative crops
  - Maintenance of farm machinery
- ***Automotive***
  - Custom accessorizing
  - Environmental impact of automotive paints
- ***Business and Marketing***
  - Effective time management
  - Prevention of repetitive motion injures
- ***Carpentry***
  - Design and care of basketball courts
  - Humane animal traps
- ***Cosmetology***
  - Salon design
  - Fragrance development
- ***Drafting***
  - Set design for a theater production
  - Kitchen design
- ***Early Childhood Education***
  - Challenges for gifted children
  - Methods for coping with aggression
- ***Horticulture***
  - Plans for landscaping a seashore residence
  - Medicinal herb use
- ***Hospitality***
  - Housekeeping efficiency studies
  - Resort marketing
- ***Medical Technology***
  - Role of computers in medicine
  - Comparison of injection technology
- ***Visual Communications***
  - Book illustrations
  - Marketing editorial cartoons

Authentic Assignments Enhance Exploratory Courses

by Carolyn Helm and Barbara Moore

There is no question that exploratory/related arts courses add value to middle grades education. The question instead is: How can we improve exploratory/related arts courses so that they positively affect student achievement? The answer is to create real-world assignments that can only be completed if students apply the content and skills they are using in their academic classes.

Applied learning is especially important for middle grades students. Their natural curiosity and creativity — combined with an emerging desire to do good works — mean they respond best to assignments that enable them to explore, investigate and make sense of their growing world. Authentic assignments require students to investigate real-world problems and applications and to make connections between subjects they are studying.

Many schools in the Making Middle Grades Work network have incorporated engaging applied learning opportunities into their exploratory courses with positive results. For example, at New Martinsville Middle School in West Virginia, the computer skills class ends each year with a project that provides opportunities for students to apply their computer skills to a business endeavor. In seventh grade, students design a restaurant by developing a floor plan, a business plan and a sample menu. In eighth grade, the culminating project is a mock travel agency that requires a business plan, marketing brochures and other public relations materials.

At Wahalla Middle School in South Carolina, students who are taking the Gateway to Technology course learn about the relationship between electrical current, voltage and resistance. Then, using Ohm's Law, they predict the values of current, voltage and resistance in circuits the students have built themselves. Next, they use technical equipment to measure precise values. Finally, students discuss variances and the reasons their predictions were or were not accurate.

In these schools and others like them, applied learning opportunities are increasing student achievement in exploratory courses. When academic content and skills are integrated into exploratory/related arts classes, students reap the benefits of increased achievement, greater motivation and retention of information. Using authentic assignments helps students in exploratory/related arts classes see how school studies are connected to real life.

Focus on Literacy—Try This Strategy:

The **Cornell Note-taking Strategy** gives students an opportunity to personalize notes and identify key points from either reading assignments or interactive lectures. Students draw a vertical line on their paper. They then list main ideas in the left column and supporting details in the right column. If students are engaged in a reading activity, you may require them to summarize the article or text using only 20 words. The notes will be a great tool to help students identify the key points for their summaries to provide the "GIST" of the reading assignment. Cornell Note-Taking also provides a great study tool for students. They can fold their paper along the vertical line and quiz themselves on topics/details in preparation for a quiz or test.

Directions: Read your assigned portion of the publication, *Quality Career/Technical Education is the Key To Success.* Use the Cornell Note-Taking template provided below to identify main ideas and supporting details found within your text. After reading and identifying key points, you will create a 20 word summary, the GIST, of your reading assignment. You will then share the GIST with a partner.

Title: ***Quality Career/Technical Education Is the Key to Success***	
Main Ideas:	**Details:**
GIST (20 Word Summary)	

Four Corners Activity

Focus on Literacy—Try This Strategy:

The **Four Corners Activity** is highly-engaging and can be used to "hook" student learning or as a follow-up strategy. It requires students to make decisions, form opinions, and develop persuasive arguments.

Directions:

1. Note the following four signs in the corners of the room**: Agree, Disagree, Strongly Agree and Strongly Disagree.**
2. Read the statement on the screen:

"Students in this center would agree that their CT teachers often stress reading, writing and mathematics."

3. Move to the corner you most relate to in regards to this statement. If you are undecided remain in the middle of the room.
4. Select a spokesperson for each corner and brainstorm the justification for your choice.
5. Each spokesperson presents the groups justification. After each spokesperson presents, have conversations and/or allow the undecided group to ask questions.
6. Undecided participants may move to any of the four corners if the justifications convince them of that particular belief.

Sample Course Goal Statements

Course: Drafting

- Read and design blueprints.
- Create three-dimensional drawings using computer-assisted design; use this skill to design and complete a metal fabrication project.

Course: Mechanical Engineering

- Research, communicate and justify design ideas throughout the design and production process for student-designed projects.
- Develop a plan (including a time line) for producing products.
- Produce products by using safe and appropriate metalworking and woodworking skills.
- Develop criteria and apply them to evaluation of products.

Course: Desktop Publishing

- Evaluate and select alternative layouts based on economic considerations.
- Develop a variety of layout designs for use in the workplace.
- Format newsletters and business reports by using a variety of word processing and graphics software programs to produce documents for a business in the community.
- Develop criteria and apply them to the evaluation of each type of layout.

Course: Introduction to Health Occupations

- Select one occupation from the health field to explore in depth; determine the educational and personal effort required to enter the field.
- Identify common infectious diseases, including causes, appropriate treatments and prevention; assess your own habits and those of others in preventing the spread of disease.
- Become familiar with guidelines for patient care, observe their application in a job-shadowing experience and maintain a journal of your observations.

Course: Banking and Finance

- Recall information about major functions of banks and other depository systems, the Federal Reserve System and modern trends in banking.
- Recognize basic accounting principles consistent with standards in the banking industry.
- Investigate the credit records of individuals and determine their worthiness.
- Plan and operate a student bank and analyze the value of students operating a school bank.

How do your course goals compare?

_____Not at all

_____Somewhat

_____To a great degree

Helpful Questions used to Examine Major Course Goals

Directions: Place a checkmark for questions you address best in your current course goals.

1. What specific bits of technical and academic information is the student expected to recall, recognize or have knowledge of as a result of this course?	
2. What translations, interpretations, estimations or predictions are students expected to make when confronted with written and oral communications or physical demonstrations representative of the technical content covered by the course?	
3. What problem(s) or projects will the student be expected to solve or complete by becoming familiar with the problem or project, remembering and bringing to bear the appropriate technical and academic procedures and principles and applying correctly the appropriate methods to the solution of the problem or completion of the project?	
4. What analyses are students expected to make by breaking down—data, a production process, technology or materials, a product or service, etc.—into smaller parts, and detecting the relationship of the parts and the way they are organized to convey meaning, to draw conclusions or to redesign a product?	
5. How are students expected to synthesize what they have learned into a new and meaningful framework or product by production of a unique communication (paper, video, speech, etc), produce and carry out a plan or proposed set of operations or study the facts of a given situation and classify or organize them into a logical, consistent scheme?	
6. What judgments are students expected to make about the value of a given technology, product, material, procedure, idea, etc. to complete either a school or work site assignment?	

Essential Competencies

- **Technical**
  - Major concepts or processes students need to achieve course goals.
- **Academic**
  - Topics, concepts and procedures from academic fields students will have to learn and apply to successfully attain course goals (language arts, math, science, social studies)
- **Thinking**
  - Competencies required when students are given open-ended assignments to create new designs, find new solutions, develop procedures for addressing a problem or project on their own and explain their reasoning. Thinking skills include: creative thinking, decision making, problem solving, knowing how to learn, and reasoning
- **Personal**
  - The qualities of a successful worker, including:
    - Taking responsibility for their own learning
    - Working with and learning from others
    - Displaying self-management, including the ability to complete assignments on schedule
    - Possessing integrity

High Expectations

Key Practice: Motivate more students to meet high expectations by integrating high expectations into classroom practices and giving students frequent feedback.

Current Status **Directions: Place a check in the column under the number that best describes the degree to which the following indicators are in place.** **1-Not Addressed 2-Planned 3-Early Stages of Implementation 4-Full Implementation**				
Quality CT Education Indicators.	**1**	**2**	**3**	**4**
Students are required to complete four or more credits in a CT Sequence.				
Students are required to use mathematics to complete challenging assignments **weekly** in their CT area.				
Students are required to complete a senior project that includes researching a topic, creating a product or performing a service and presenting it to peers.				
Teachers assign 30 minutes or more of daily homework for CT courses.				
Technology Centers have established prerequisite coursework (both academic and CT) for each program of studies.				
Overall Indicators that Support High Expectations.				
Teachers clearly indicate the amount and quality of work necessary to earn an A or B.				
Teachers assess students by grading both the product and associated academic and technical skills used to complete the project.				
Students are required to do one or more hours of homework across all subjects each night.				
Students are required to revise their essays and other written work several times to improve quality.				
Directions: Check the appropriate column.	**YES**		**NO**	
The center has and enforces a homework policy.				
The homework policy is communicated to students and parents.				
The center has and enforces an attendance policy.				
The center has and enforces a tardy policy that expects students to be in class on time.				
Assignments are benchmarked to the proficient or advanced level.				
Performance descriptors are used to evaluate the level of questions.				
Higher-order questions are used during classroom discussions and on all assessments.				
Common course syllabi, rubrics and end-of-course exams have been developed.				
Teachers identify and communicate what students should know and be able to do at the end of a lesson or activity.				

High Expectations
Specific Actions

Review the major actions for <u>High Expectations</u>. Brainstorm together the ones you might implement during years one, two and three. List specific implementation steps necessary to implement each major actions.

Identify one outstanding practice that supports high expectations.
• **Major Action to establish common expectations for proficient-level work (i.e., define A, B, and C work).**
Identify the major weaknesses in course goals and identify two specific actions to modify course goal statements.

Pre-learning Concept Check

Focus on Literacy—Try This Strategy:

A **Pre-learning Concept Check** prepares students for what they are about to read or discuss, by having them react to a series of statements related to the new content. Teachers have found that Pre-learning Concept Check guides are valuable because they prepare students to read/discuss by connecting them to the information ahead of time. Students tend to become interested in the topic because they have been asked their opinion.

An Inventory on Rigorous Curriculum

Instructions: Rate your center by placing one of the following symbols in the space provided in the left column next to each statement. If the statement is **true** for your center, place a **plus-sign (+)** in the space provided. If the statement is **mostly true,** place a **checkmark** (✓). If the statement is **not true** for your center, place a **zero** (**0**) in the space provided.

_____ 1. All students are required to take 4 years of college preparatory-level English in order to graduate.
_____ 2. All students are required to take a higher-level mathematics class in their senior year.
_____ 3. Eighth-graders leave the middle school having passes pre-Algebra or Algebra I with a common end-of-course exam.
_____ 4. All students take college-prep biology, and chemistry or physics.
_____ 5. Center graduates complete the coursework required for a Career/Technical completer and/or earn an industry certification.
_____ 6. Technology center teachers encourage students to take rigorous academic studies (both those available on site, at the home high school and with postsecondary partners).
_____ 7. Students are pushed to earn employer certifications and/or postsecondary credits as a part of their program of studies.
_____ 8. Students have the same adult advisor throughout high school (at their home school).
_____ 9. Students participate in formal guidance/advisory sessions at the Technology Center that focuses on program completion and employer expectations.
_____ 10. Students leave the eighth grade with a four-year plan for course-taking in high school.
_____ 11. Career/technical/exploratory classes (offered either at feeder middle schools or high schools) provide students with a preview of the program of studies offered at the Technology Center and reinforce academic skills needed for success.
_____ 12. Career/technical classes highlight academic standards as they apply to daily lessons and activities.
_____ 13. Career/technical teachers assess both technical and academic knowledge and skills needed to complete assignments.
_____ 14. All students can select and use appropriate technology to complete a task.
_____ 15. All students are required to read materials in each class.

Add all plus-sign s (+) together: _____.

Add all checkmarks (✓) together: _____.

Add all zeros (0) together: _____.

Recommended Career/Technical and Academic Concentrations

Career/Technical Concentration is defined as:
At least four credits in a concentration that consists of an approved sequence of career/technical courses. Each student will have a choice from at least four career/technical concentrations in career cluster pathways at school sites, work sites, career/technical centers, postsecondary institutions; and a blended concentration, such as mathematics/science/technology or humanities and business studies. Each concentration will include one or two Advanced Placement (AP), International Baccalaureate (IB) or dual credit courses.

Students may also earn the following Academic Concentrations:

A. **Mathematics and Science —** Four or more credits each in mathematics and science courses with at least one credit at the Advanced Placement level.

B. Humanities — Four credits each in college-preparatory/honors English and social studies with at least one course at the Advanced Placement level, and four more credits drawn from foreign language, fine arts, journalism, debate or additional courses in literature, history, economics, psychology or other humanities areas.

Actions Technology Centers can take to Support the *TCTW* Core Curriculum:

- **Assist students in seeing the need for taking a rigorous academic core.**
- **Develop a career pathways handbook that outlines the sequence of career/technical and academic courses needed to complete the program of studies.**
- **Establish definitions for program completers.**
- **Hold quarterly vertical alignment meetings with both high school and postsecondary institutions.**
- **Analyze and communicate student achievement data by pathway area.**
- **Increase course offerings that provide students the opportunity to earn both CT and academic credit.**
- **Establish prerequisite courses for CT coursework, both academic and elective.**
- **Use guest speakers, hold career expos and college fairs.**

What do graduates say their high school should have done differently?

When graduates reflected upon their high school classroom experiences, 60 percent or more strongly or somewhat agreed that the schools should have

- placed more emphasis on mathematics;
- provided them with information and counseling that would help them continue their education;
- placed more emphasis on verbal communication skills;
- placed more emphasis on career/technical programs;
- assisted them in meeting high academic standards; and
- expected them to read in all their classes.

At least 30 percent of the career/technical graduates believed their career/technical teachers should have placed more emphasis on

- how mathematics is used in specific career/technical areas;
- reading and interpreting technical books and manuals;
- writing technical and service reports and business letters;
- meeting high standards and expectations; and
- showing how science is used in specific career/technical areas.

Source: 2004 Follow-up of Career/technical Graduates from *HSTW* Schools

Program of Study

Key Practice – Students complete a plan of study with a true concentration of an approved sequence, including at least four CT courses and an upgraded academic core leading to better preparation for postsecondary studies.

Directions: For the next activity, please use site-based data or consider the graduating class of 2006 to provide an estimated percentage for each of the following:

Focusing on the *TCTW*-recommended curriculum	**Current Status: Percentage**	
Percentage of students completing **four credits** in college-preparatory-level English/language arts courses.		
Percentage of students completing **four mathematics credits** with at least three credits equal to Algebra I, geometry and Algebra II.		
Percentage of students completing **three science credits** (four in schools with a block schedule), including two credits equal to chemistry, physics or lab-based college-preparatory biology.		
Percentage of students completing **three social studies credits** (four in schools with a block schedule)		
Percentage of students completing **four credits in a concentration:** • A planned sequence of CT courses • Academic Concentration	**CT:** **Academic:**	
Percentage of students completing **a computer technology course** aimed at teaching students database management, PowerPoint, the Internet and e-mail as tools for project-based learning.		
Number or percentage of students receiving the *TCTW* Award of Educational Achievement.		
Percentage of students gaining employer certification in their program of study.		
Percentage of students earning postsecondary credit(s) in their program of study.		
Percentage of students who are considered college or career ready (as defined by performance on state or national assessments such as Work Keys, Compass, Asset, ACT, SAT, etc.)		
Directions: Check the appropriate column.	**YES**	**NO**
All students must complete the recommended academic core.		
All students must complete a career or academic concentration.		
CT Teachers encourage students to take rigorous academic courses.		
The Technology Center offers courses that allow students to earn both CT and academic credit, such as Construction and Architectural Geometry.		
CT students frequently complete projects requiring them to read related technical manuals.		
CT students complete frequent projects that require them to use related mathematics.		
CT students are required to explain how they perform certain tasks to others.		
CT students must write up a work plan before undertaking a major project.		
The Technology Center addresses academic deficiencies that prevent students from achieving CT course goals.		
A guidance and advisement system exists that has every student establishing a program of secondary studies based on career goals (6 year plan).		

Program of Study
Specific Actions

Review the major actions for <u>Program of Study</u>. Brainstorm together the major actions you can take (both on the Technology Center campus and in collaboration with feeder high schools) to increase by 10 go 20 percent the percentages of students completing both a concentration (Major) and the recommended academic core for the class of 2008, 2009 and 2010. Include specific implementation steps necessary to implement each major action.

Identify one outstanding practice that supports the *TCTW* Recommended Core Curriculum.
Major campus actions to work with feeder schools to increase the percentage of students take the recommended academic sequence and to supplement the recommended academic sequence at the CT Center.
1. 2. 3.

Excerpt from: **"Technical Literacy and Assessment: *How They Can Improve Student Performance and Career Advancement,"***

by Gene Bottoms and Doug Rhodes

Technical Literacy Defined

Simply put, Technical Literacy seeks to prepare students for further study and career advancement by integrating the acquisition of technical competence with a new priority of relating technical knowledge and skill to reading, communication, numeracy skills, and scientific knowledge and methods in the CTE classroom. The essential focus given to acquiring knowledge and skills within a career area often stops short of reinforcing the importance and relationship of so-called academic skills within the Career and Technical setting. Technical Literacy is defined as students being able to:

1. Demonstrate understanding and application of essential technical content, terms, concepts, and procedures of the field, to find solutions to community problems and to perform necessary tasks;
2. Read, analyze, interpret, communicate, and use writing in the CTE field;
3. Use mathematics to solve problems encountered in the field in entry level and beyond; and
4. Apply the processes and skills of science, including methods of inquiry, logic, and precision, and a knowledge of systems and patterns of change.

There is no substitute for achieving high levels of technical competence within one's chosen field. Understanding and applying the concepts and processes of a field is the fundamental task of learning in one's chosen area of concentration. But, preparation for a career within a concentration or Pathway must be joined by a significant emphasis on how the academic skills of reading, communication, mathematics, and science relate to and strengthen technical competence, and how these skills increase the probability of long-term success and agility in one's chosen field.

The Most Effective Career/Technical Courses Are Those That Advance both Technical and Academic Knowledge and Skills

What may be rapidly emerging is the view that effective Career/Technical programs are those that recognize that the most technical of subjects are those that advance academic skills. What will distinguish the new CTE programs from the old and traditional Voc-Ed approach is their ability to use academic skills in the context of broad career and occupationally specific fields that prepare students for a lifetime of learning and career advancement.

New Employee Relationship

This unified vision is buttressed by new requirements of the highly competitive workplace. It is particularly critical because there is a new relationship that employees have with industrial and business organizations. This new relationship is increasingly built upon employee self-reliance and continuous skill development. In response, the new generation of Career/Technical programs must achieve a new balance between meeting short-term employer needs of entry-level skills, and those long-term survival and advancement needs of career-directed students.

The previous agenda of the 1970s, and before, was based on the premise of meeting the needs of a domestic economy and a mutually sustaining paternal relationship between the employee and the employer. The new agenda for the twenty-first century is based on the premise of an international, or global, economy that is information centered, and rapidly changing. The rate of this change has become so swift that corporate profitability and survival depend on new strategies of production from just-in-time supply of the factors of production to an elastic supply of employees, and a just-in-time supply of newly needed employee skills. The rapid increase in the exportation of manufacturing, service, and technical jobs to other countries represents the greatest threat to students preparing for life-long productive careers. This creates a different relationship between employer and employee.

Using Literacy to Engage Students in Quality Instruction

Current Status

Directions: Place a check in the column under the number that best describes the degree to which the following indicators are in place.

1-Not Addressed 2-Planned 3-Early Stages of Implementation 4-Full Implementation

Literacy Across the Curriculum – SREB Goals	**1**	**2**	**3**	**4**
Students are required to read 25 or more books (or their equivalent) across the curriculum. Current Number of Books _____ Note: One hundred pages of technical related articles is the equivalent of one book.				
Students are required to write weekly in all classes.				
Students use reading and writing strategies to enhance learning in all classes				
Students write research papers in all classes				
Literacy Across the Curriculum - Strategies	**1**	**2**	**3**	**4**
Students **often** use word-processing software to complete an assignment or project.				
Students **often** revised their essays or other written work several times to improve their quality.				
Students **at least monthly** read and interpret technical books and manuals (either hard copy or via CD Rom) to complete assignments in their CT area				
Students **at least monthly** complete short writing assignments of one to three pages for which they receive a grade in their CT classes.				

Directions: Check the appropriate column.	**YES**	**NO**
Students are required to read a technical article every week in the CT classroom.		
Students are required to demonstrate understanding of the technical materials they read.		
Students are required to prepare a "How to" manual on a topic chosen from the career field of study.		
Students are required to keep a journal of the major activities they have completed each week using their own words to describe new understandings they have gained.		
Students are required to keep a journal of mathematical formulas completed, used and applied in the course.		
Students are required to research and compare procedural manuals before starting a major task or project.		
Teams of students are required to read a common chapter in a book or technical article and work together to prepare a PowerPoint to share main ideas.		
Students are required to give oral presentations **at least monthly** in CT classes.		
At the completion of projects, student assessments determine if students can read and interpret the technical materials involved in completing a project.		
Student assessments require students to read sections of technical materials and answer questions to test reading comprehension.		
Students have access to a variety of reading materials on campus, including classroom libraries.		
Student assessments require students to read different pieces of technical material and determine which one is accurate.		
Students are assessed in their ability to reference documents.		
Teachers require students to research industry updates using related magazines, journals and websites.		

Using Literacy to Engage Students in Quality Instruction
Specific Actions

Review the Benchmark major actions for <u>Literacy.</u> Brainstorm together the ones you might implement during years one, two and three. List specific implementation steps necessary to implement each major action.

Identify an outstanding practice that supports campus-wide literacy efforts.
Determine major actions to get students to read the equivalent of five books a year and demonstrate understanding of materials read.
Determine major actions to increase students' oral and written use of the language as a center for continued learning their field of study.
Determine major actions to revise classroom assessments to measure a student's ability to read and interpret technical manuals.

SREB's Literacy Goals:

- **Students will read the equivalent of 25 books per year across the curriculum.**
- **Students will write weekly in all classes.**
- **Students will use reading and writing strategies to help them understand and use the content of all classes.**
- **Students will write investigative research papers in all classes.**
- **Students will be taught as if they were in honors language arts classes.**

Emphasizing Mathematics and Science Concepts to Enhance Instruction

Current Status

Directions: Place a check in the column under the number that best describes the degree to which the following indicators are in place.

1-Not Addressed 2-Planned 3-Early Stages of Implementation 4-Full Implementation

Mathematics Across the Curriculum – Strategies	**1**	**2**	**3**	**4**
CT teachers assign **weekly or bi-weekly** a short exam to see if students can solve 8-10 math problems like those covered in the unit.				
CT teachers meet **annually** with a high school math teacher to develop a final exam that will contain authentic problems similar to those found in the CT field				
CT teachers meet regularly with high school mathematics teachers to align CT projects with mathematical concepts to help students see the math application in the CT field.				
CT students take a mathematics entrance examination designed specifically for each program area to identify and address mathematic deficiencies.				

Directions: Check the appropriate column.	**YES**	**NO**
Students complete a set of math problems **weekly** that are similar to ones found in the field of study.		
Students are assigned to a math team to solve math problems.		
Students use a related math textbook with sample problems from the CT field.		
CT teachers use VICA/Skills USA math exams as a way to help students understand the level of math required to enter and advance in the workplace.		
Technology Centers bring in guest speakers or examples of how mathematics is used in the field.		
CT teachers have identified and use common mathematics vocabulary and procedures.		
Students can earn mathematics credit in an integrated CT course.		
CT teachers encourage students to take high-level mathematics courses.		
CT teachers possess knowledge and skills in mathematics required to enter postsecondary education in their field and would not have to take remedial courses in mathematics.		
The CT Center provides proper staff development and support for CT teachers to pass exams and acquire the level of mathematics knowledge necessary to assist students in passing graduation exams in math, employment exams, and placement exams for post-secondary programs?		

Science Across the Curriculum - Strategies	**1**	**2**	**3**	**4**
CT teachers **often** show how scientific concepts are used to solve problems in work-related situations.				
Students use science equipment to do complete classroom activities**.**				
Student work with one or more students in their class on a challenging science assignment **at least monthly**.				

Directions: Check the appropriate column.	**YES**	**NO**
Students complete any three of the following science courses: college-preparatory physical science, college-preparatory biology/biology 2, anatomy, college-predatory chemistry, physics or Advanced Placement science.		
Students can earn science credit in an integrated CT course.		
CT teachers identify science concepts as they apply to their program area.		
CT teachers and high school teachers identify and use common science vocabulary and processes.		
CT students project require students to complete scientific investigations.		

Emphasizing Mathematics and Science Concepts to Enhance Instruction
Specific Actions

Review the Benchmark major actions for <u>Emphasizing Mathematics and Science Concepts</u>. Brainstorm together the ones you might implement during years one, two and three. List specific implementation steps necessary to implement each major action.

Identify an outstanding practice that supports mathematics and science integration efforts
Major actions for integrating mathematics assignments into CT courses, which are aligned to state graduation as well as college and career readiness standards.
Major actions to support CT teachers to strengthen their mathematical knowledge and skills and help them plan learning experiences for that prepare students for college and career readiness.
Major actions to plan major learning activities or projects that involve mathematics and/or science application.

Jigsaw Activity

Focus on Literacy—Try This Strategy:

A **Jigsaw Activity** helps to fully engage students in reading and analyzing text. Teachers divide the text that they want students to read and analyze in to sections. Students are then grouped in teams of three to six; each team is responsible for analyzing a designated section of text to become the "experts" on what they read. After "expert teams" have analyzed the text, students are regrouped so that there is one "expert" for each section of text. The "experts" then are responsible for teaching the key concepts from their section to all other group members.

Our jigsaw activity today will utilize the SREB publication on the following pages.

"High-Quality Career/Technical Programs Give Students a Boost Toward a Good Job and Postsecondary Studies"

- 2005 *TCTW* Newsletter

Directions:

1. **Assign each member of your table group a number from 1 to 5, representing Expert 1, Expert 2, etc. Please try to make sure that you have at least one of each number (1-5) represented at your table.**

2. **The Article has been divided into five sections.**

   Expert 1 will read the section beginning with Exploring Careers in the Middle Grades

   Expert 2 will read the section beginning with Aligning Curriculums and Assessments to Academic and Industry Standards

   Expert 3 will read the section beginning with Strengthening the Academic Knowledge and Skills of Career/Technical Teachers

   Expert 4 will read the section beginning with Building Students' relationships with Experts from Their Chosen Career Fields

   Expert 5 will read the section beginning with Giving Students Access to High-Quality Career/Technical Studies

3. **Have each "Expert" read the section assigned to them individually (6 minutes)**
4. **When the facilitator signals, all Experts will move to common groups to discuss the findings from their section. All Expert 1's will sit together, as will all other Expert groups. (5 minutes)**
5. **Experts will move back into their original teams to teach the key points from their section to the other members of the team. (Each "Expert" will have 2 minutes)**

HIGH SCHOOLS THAT WORK

SREB

Making Middle Grades Work

Best Practices for Implementing HSTW *and* MMGW

High-quality Career/Technical Programs Give Students a Boost Toward a Good Job and Postsecondary Studies

Schools that provide access to high-quality, high-demand career/technical studies can raise students' academic and technical achievement, increase high school completion rates and prepare students for postsecondary studies and good jobs. Middle schools as well as high schools have a role to play in equipping students for productive careers.

Middle schools can lay the foundation by getting students to participate in exploratory studies to identify the career fields they like best. High schools can improve the quality of career/technical studies by aligning the curriculum and assessments to academic and industry standards; supporting career/technical teachers with mathematics, reading and science content knowledge; offering quality work-based learning; and involving students in career concentrations through small learning communities, career academies, career/technical centers and early postsecondary experiences.

Exploring careers in the middle grades

Exploratory courses, particularly those that focus on mathematics and science, help middle grades students learn about a variety of career fields. The ACT Explore® program is designed to help eighth-graders investigate a broad range of options for the future. This early-planning tool can provide baseline information on students' academic knowledge and skills and can assess career interests as students develop long-range plans for high school and beyond. (*Contact Judy Trice at ACT Regional Professional Development in Austin, Texas, at judy.trice@act.org.*)

A number of middle schools have been successful in using programs that incorporate academic skills into career planning and exploration. For example:

October 2005

Southern Regional Education Board

592 10th St. N.W.
Atlanta, GA 30318
(404) 875-9211
www.sreb.org

This newsletter of "best practices" in implementing *High Schools That Work* and *Making Middle Grades Work* is based on presentations related to Conference Objective 3 (Providing High-quality Career/Technical Education) from the 19th annual *HSTW* Staff Development Conference. The conference was held July 13-16, 2005, at the Gaylord Opryland Resort and Conference Center in Nashville, Tennessee. For more information on Conference Objectives and Sub-objectives, go to www.sreb.org.

6.

- Teachers in the **Henry County** school system in McDonough, Georgia, wrote and implemented a modular program that incorporates technology with student-directed learning to emphasize mathematics, science, language arts, reading and life skills. The program has received wide recognition and was featured on CNN television. (*Contact Lynn Pack at lynnpack@bellsouth.net.*)
- Vital Link is a program for all eighth-graders in the **Fayetteville (Arkansas) School District**. This program gives a "behind the scenes" look at the world of work and prepares students for apprenticeship opportunities in grades 11 and 12. Some 350 eighth-graders visit work sites where they see that success in the classroom leads to success in the workplace. The local chamber of commerce is a partner in the program. One student impressed his "employer" so much that the business owner asked him to serve as an apprentice. He worked at the store throughout high school and college, received an engineering degree from the University of Arkansas, and has returned to the business as a full-time employee. (*Contact Phyllis McGinty, youth apprenticeship director, at pmcginty@fayar.net.*)
- The Gateway to Technology middle grades curriculum focuses on developing stronger mathematics, science and technology skills. It shows — rather than tells — students how professionals in the engineering field use technology to solve everyday problems. (*Contact Kenneth Mason, Project Lead The Way, at kenneth.mason@sreb.org.*)

Aligning curriculums and assessments to academic and industry standards

High-quality career/technical programs begin with curriculums and assessments that are aligned to academic and industry standards. A course syllabus describing what students are expected to learn, what major projects and assignments they will complete, and how they will be assessed will help teachers plan standards-based courses and communicate performance expectations to students and parents. Schools can create a course syllabus template for all teachers to follow, establish criteria for what is included, and provide time for teachers to work together on course syllabi and share examples of well-written syllabus components. (*For more information on preparing syllabi, look at* Designing Challenging Vocational Courses — A Guide to Preparing a Syllabus *by Gene Bottoms, David J. Pucel and Ione Phillips, 97V46, 1997, $10.)*

Academic and career/technical teachers can assess whether the syllabus is aligned to academic and industry standards by collaboratively and continually looking at student work on assignments and assessments, analyzing the quality of that work, and deciding on steps to take in getting more students to reach the Proficient level.

Using a process such as a "tuning protocol" to examine student work provides a structure for teachers to bring student work to their colleagues for feedback. The components of the tuning protocol process are: 1) a teacher's presentation of an assignment, 2) clarifying questions by his or her colleagues, 3) warm and cool feedback and 4) the presenter's response to the feedback. A facilitator sets the tone for a tuning session by asking the question, "What can we do to get more students to score at the Proficient level on this assignment or assessment?"

Caddo Career and Technology Center in Shreveport, Louisiana, is aligning all of its career/technical programs to industry standards. "The value of industry-based certification is that it provides validity to the curriculum," Principal **Gayle Flowers** said. "It leads to better assessments and ultimately to better instruction."

Depending on the criteria for certification required by each industry, Caddo seeks accreditation for its career/technical programs and prepares students to take industry certification exams. The center's automotive program was the first in the state to earn Automotive Youth Education Systems (AYES) accreditation and was the only one in the nation to receive a perfect accreditation score. All students are expected to take industry certification exams if such exams are available in their career/technical areas. In the 2004-2005 school year, a total of 402 industry certifications were earned out of 800 students enrolled at the center. Some students earn more than one certification. A local foundation pays half the cost of taking a certification exam; students and their parents pay the other half.

Teachers at Caddo use industry standards to develop course syllabi that are reviewed annually by employers. Each career/technical teacher completes a workplace visit. As a result of this focus on excellence, Caddo can point to strong support from the business community, greater involvement in student organizations, and more students taking and earning postsecondary credit. (*Contact Gayle Flowers at gflowers@caddo.k12.la.us.*)

Strengthening the academic knowledge and skills of career/technical teachers

Research has shown that students' mathematics achievement increases when career/technical teachers enrich the curriculum with mathematics concepts. To achieve this kind of enrichment and to improve student achievement, career/technical teachers need professional development showing how to combine academic knowledge and skills from mathematics, science and communications with the occupational content of career/technical programs.

The **National Research Center for Career and Technical Education** identified five principles of effective staff development in improving the mathematics content of career/technical education and raising student achievement. The same principles are likely to hold true for science and communication.

- **Create and sustain a "community of professional practice."** School districts can assist schools in organizing eight to 10 teams of career/technical and academic teachers representing various career/technical areas such as marketing or auto technology. The teams need to work together over a period of time to create academically enhanced strategies for career/technical classrooms.
- **Fit the academic content to the career/technical curriculum rather than the other way around.** True contextual learning occurs when the academic content emerges from an authentic assignment. Forcing a mathematics curriculum, such as Algebra I, into a career/technical curriculum will be less effective because it quickly will resemble a traditional mathematics course.
- **Build an appreciation for mathematics as a workplace skill.** It should be just as appropriate for students in an auto technology course to reach for a mathematics formula as it is to reach for a wrench.
- **Maximize the amount of mathematics in the career/technical curriculum.** Academic knowledge does not follow a sequence when it comes from work-related projects. Authentic projects with rich mathematics requirements should be developed whenever possible.
- **Career/technical teachers are "teachers of mathematics in career/technical education."** They are not mathematics teachers. Make sure they have professional development to build their skills in teaching the mathematics content in their career/technical courses.

Schools can promote academic knowledge and skills in career/technical education by conducting summer workshops for career/technical teachers and academic teachers. Working in teams, the teachers can identify the location of academic content in career/technical courses and develop instructional strategies to use in the coming year. Professional development and support activities during the school year will give teachers opportunities to refine and improve the strategies.

(*Contact **James Stone III**, National Research Center for Career and Technical Education, University of Minnesota, at stone003@umn.edu.*)

Science teachers and career/technical teachers at **Charles H. McCann Technical School** in North Adams, Massachusetts, work together to ensure that all students complete four years of college-preparatory science. Teachers use engaging, career-focused science projects to involve students in the science curriculum and to develop high-level cognitive skills. The annual projects gradually prepare students to complete the rigorous project required for senior year. The success of this added emphasis on science is evident in the fact that failure rates in science have declined from as high as 30 percent to below 10 percent. Students who participated in the 2004 *HSTW* Assessment exceeded the performance goal in science and scored higher than the average for students at all *HSTW* sites.

The Class of 2009 will need to pass a statewide science assessment to graduate from high school. "We are not worried about our students meeting this requirement, because ever since we joined the *HSTW* network we have been working hard to get them ready for science in college and a career," Assistant Principal **Barbara Malkas** said. "This year we are offering the first course of Project Lead The Way as an elective in addition to our science requirement." (*Contact Barbara Malkas at bmalkas@mccanntech.org.*)

The schoolwide literacy campaign at **EHOVE Career Center** in Milan, Ohio, focuses career/technical and academic teachers on helping students read and write across the curriculum. Career/technical teachers receive professional development on various levels of writing and learn to make assignments that are appropriate for each level. The levels are: capturing ideas, responding correctly, editing, peer editing and publishing. The assignments might include writing a journal at the level of "capturing ideas" and completing a research report at the "publishing" level. Teachers document writing practices in their lesson plans and display writing posters in their classrooms. The campaign also includes a summer reading program, sustained silent reading in classrooms and incentives for students who read for pleasure. A reading-across-the-curriculum consultant, who visits the center twice a year, reviews teachers' logs on the number and types of writing assignments given and meets individually with teachers to discuss progress. (*Contact Assistant Director Mark Ringlein at mringlein@ehove-jvs.k12.oh.us.*)

Building students' relationships with experts from their chosen career fields

The relationships developed in a work-based learning experience will help a student develop a greater understanding of his or her chosen career field. This type of learning experience expands greatly on what is learned in the classroom in the areas of technology, methodology, terminology and techniques. A good work-based learning experience can help a student clarify his or her decisions about a career and a postsecondary program of study. A rigorous and well-planned apprenticeship program or internship program can revitalize the senior year and help students prepare for higher education and the workplace. Job shadowing experiences can assist students in selecting a career concentration and related course work for high school.

A successful work-based learning program should be designed carefully to provide a number of learning-rich activities and opportunities, such as:

- paid and unpaid experiences to accommodate more students with a multitude of career interests;
- regularly scheduled seminar classes with challenging assignments that give students opportunities to share and reflect on their experiences;
- a formal presentation and a final research paper to emphasize the importance of strong academic knowledge and good communication skills in the workplace;
- an adult mentor at the business or industry to teach job requirements and procedures;
- rotation through different areas of the workplace;
- a learning plan listing workplace responsibilities;
- a program coordinator to monitor students' progress, visit the worksite and conduct performance reviews; and
- end-of-program "credentials" to help students showcase their skills and experiences for future employment opportunities and acceptance into postsecondary programs.

The youth apprenticeship program at **Fayetteville High School** in Fayetteville, Arkansas, was created to broaden educational, career and economic opportunities for students through partnerships involving businesses, schools and community-based organizations. A total of 353 students in grades 11 and 12 were enrolled in the program in the 2004-2005 school year. The program integrates academic and career/technical learning and meets state standards. Students completing the program have the satisfaction of graduating from high school with a skills certificate from the state department of labor, career training and practical work experience. They receive elective school credit for their participation. Arkansas businesses employing students as youth apprentices are eligible for state tax credit. (*Contact Superintendent Bobby New at bnew@fayar.net.*)

Gooding High School, located in rural Gooding, Idaho, used limited resources to create a variety of work-based, cross-curricular opportunities such as career academies and senior projects. The academies are small learning communities for students in grades 10 through 12. The four academies are: Information and Technology, Career Arts, Cabinetry/Millwork and Health. The purpose of an academy is to combine academic rigor with students' career interests. Students take four English courses, three mathematics courses and three science courses. Dual credit/tech prep college credit is available. The senior year is utilized to the fullest: Students take English, mathematics, science, economics and academy or career courses. They also complete a senior project that combines academic and career/technical knowledge and skills. (*Contact Bridgit Arkoosh, English/language arts teacher, at arkooshb@gooding.k12.id.us.*)

Giving students access to high-quality career/technical studies

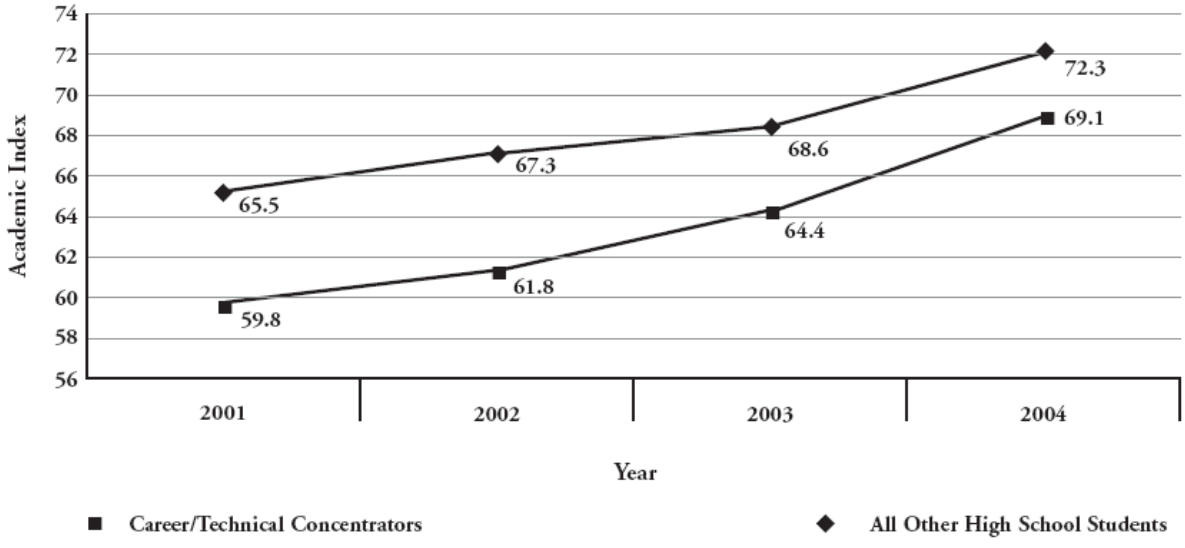
Schools can give more students access to high-quality career/technical studies through a variety of strategies: designing concentrations for high school programs of study, organizing into small learning communities or career academies, and increasing access to postsecondary institutions through dual-enrollment and Web-based courses.

Several states have adopted policies to help schools add focus and purpose to students' high school experiences. Leaders from **Maryland**, **Kentucky** and **South Carolina** point to success in closing gaps in achievement by requiring all students to complete a rigorous academic core of courses and to designate a career or academic concentration. (*Contact Rodney Kelly, Kentucky Department of Education, at rodney.kelly@education.ky.gov; Kathy Oliver, Maryland Department of Education, at Koliver@MSDE.State.MD.US; or Bob Couch, South Carolina Department of Education, at jcouch@sde.state.sc.us.*)

States and schools that want to narrow the gap between career/technical students and all students can raise the quality of high school career/technical studies and integrate academic content into those courses. The Division of Career and Technical Education in Kentucky found that career/technical concentrators are making a faster rate of gain in academic achievement as the gap closes between those students and all other students. (See Figure 1.)

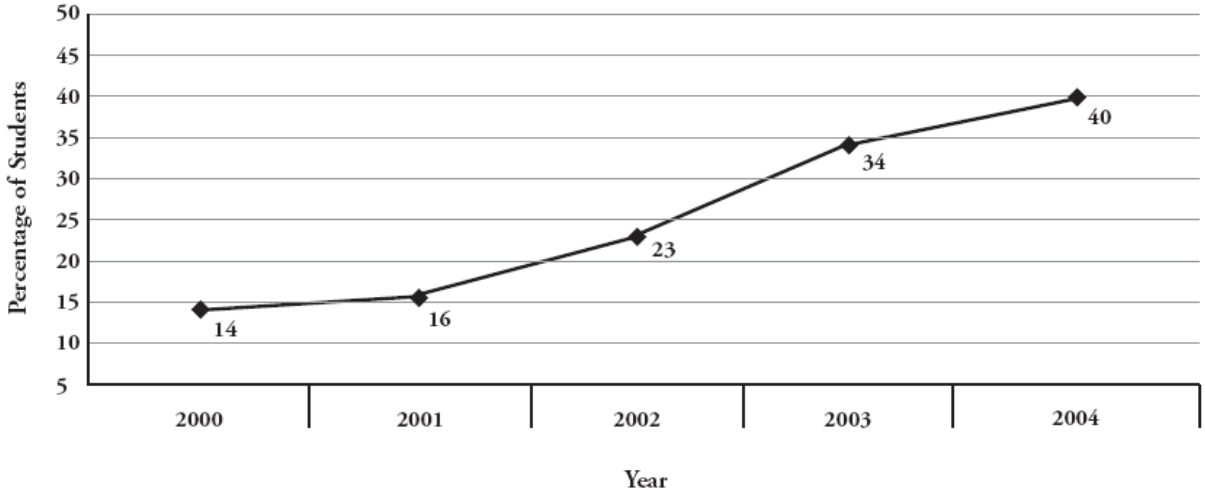
High school career/technical leaders can work with postsecondary and business leaders to set occupational standards that career/technical students need to meet and can develop assessments to measure whether the students are meeting the standards. After Kentucky reached agreement on essential industry standards for high school career/technical studies and developed tests to determine if students were acquiring the desired technical knowledge and skills, it has seen a steady rise in the numbers of students passing the program-based exams. Students that pass the exams receive skills standards certificates. Kentucky began offering the exams in 2000. (See Figure 2.) (*Contact Rodney Kelly at rodney.kelly@education.ky.gov.*)

Figure 1: Closing the Academic Achievement Gap Between Career/Technical Students and All Other Students in Kentucky



Source: Division of Career and Technical Education, Kentucky Department of Education
Based on: Commonwealth Accountability Testing System (CATS) Data

Figure 2: Increases in the Percentages of Career/Technical Students Earning Skills Standards Certificates in Kentucky



Source: Division of Career and Technical Education, Kentucky Department of Education
Based on: Commonwealth Accountability Testing System (CATS) Data

One way to raise academic and career/technical achievement is to organize a high school into several career-themed small learning communities or career academies. A team of academic and career/technical teachers in each academy actively engages a cohort of students in learning academic concepts connected to a career field. Students participate in a guidance and advisement program to plan for the future and receive extra help as needed to meet high expectations. (*Contact Heather Sass,* HSTW *school improvement consultant, at heather.sass@sreb.org.*) The National Academy Foundation has standards of practice to help schools implement academies or career-focused small learning communities. (*Contact Gregg Betheil, National Academy Foundation, at gregg@naf-education.org.*)

Another good way for schools to provide access to high-quality career/technical studies is to link with area postsecondary institutions to offer career-focused courses and to give students a jump on earning college credits before graduating from high school. This approach is particularly important for schools that lack the resources and/or facilities to offer a wide range of career/technical programs. **St. Louis Community College** in St. Louis, Missouri, and **Ivy Tech Community College of Indiana** in Columbus, Indiana, are two postsecondary institutions that have developed seamless career pathways from high school to college in four areas: science, technology engineering, mathematics and health science. (*Contact Michelene Moeller, St. Louis Community College, at mmoeller@stlcc.edu or Jennifer Steinwedel, Ivy Tech Community College, at jsteinwe@ivytech.edu.*)

Los Fresnos High School in rural Los Fresnos, Texas, uses strong partnerships with colleges and universities to offer a number of dual-enrollment and articulated classes. Dual-enrollment classes include U.S. history, economics and government, medical terminology, English IV and Microsoft Word and Excel. Students may also enroll jointly at the high school and at Texas State Technical College (TSTC) to study career/technical courses in health science technology, energy and environmental technology, plant maintenance, building trades, computer maintenance, electronics, aircraft mechanics, auto collision repair, auto technology, Principles of Technology, heating and air conditioning, machine shop, welding, advertising design and computer assisted design. The high school has articulation agreements with TSTC, the University of Texas at Brownsville and Texas Southmost College, all local postsecondary institutions. The Ready, Set, Teach! program for students that want to enter the teaching field is articulated with all University of Texas schools. Other articulated classes are hospitality services, food science and nutrition, food science technology, and child development.

"When students take advantage of these many opportunities, they are able to graduate from high school with college credit at no cost to their families," said **Sue Ellen Hill** of the career/technology department. "Many can have the first year of college almost completed." (*Contact Sue Ellen Hill at shill@lfcisd.net.*)

A New Design for Career/Technical Studies

Many high schools seeking to strengthen their career/technical programs have adopted a national pre-engineering curriculum known as Project Lead The Way. Students in PLTW prepare for postsecondary engineering studies by taking a combination of college-preparatory-level mathematics and science courses along with challenging pre-engineering courses.

The PLTW curriculum is designed to help students understand engineering problem solving, understand how technological systems work with other systems, use mathematics knowledge and skills, communicate effectively and work with others.

High Schools That Work encourages schools to offer PLTW to give students another option for quality career/technical studies leading to college and a rewarding career. *HSTW* compared high school students enrolled in PLTW with students from similar career/technical fields of study and from career/technical studies in general. The study showed that PLTW students:

- had significantly higher achievement on a National Assessment of Educational Progress (NAEP)-based mathematics test than students from comparable career/technical fields;
- scored significantly higher in reading, mathematics and science than students from all career/technical fields;
- completed significantly more higher-level mathematics and science courses than students in similar fields or in all career/technical fields;
- were taking classes that engaged them in completing challenging assignments;
- experienced higher-quality career/technical classes requiring students to use academic knowledge and skills to complete assignments.

As a result of PLTW, schools have learned the value of investing in high-quality curriculum materials, defining sequences of mathematics and science courses, updating laboratories and supplies, providing staff development for teachers and counselors, developing alliances with colleges and universities, and using end-of-course exams.

(The *HSTW* study of students in Project Lead The Way is detailed in a research brief titled *Project Lead The Way: A Pre-engineering Curriculum That Works — A New Design for High School Career/Technical Studies.* By Gene Bottoms and Karen Anthony. (05V08); 16 pages; $2; $1 each for 10 or more. The study is the focus of a PowerPoint presentation titled "A New Design for High School Career/Technical Studies" by Gene Bottoms at the 2005 *HSTW* Staff Development Conference. (Download free from *HSTW* Publications and Materials on the SREB Web site at www.sreb.org.) A videotape (VHS) of the presentation also is available. (05V46v); $30. For more information on ordering materials, visit www.sreb.org; call (404) 875-9211, Ext. 236; or e-mail publications@sreb.org.)

(05V58w)

Brainstorming Activity

Directions: Based on the information that you learned from the Jigsaw activity, answer the following two items as a table team.

1. Why give students access to quality Career/Technical Programs?

2. Create a list of indicators for a high-quality Career/Technical Program.

Career/Technical Studies

Key Practice --Provide more students access to intellectually challenging career/technical studies in high-demand fields that emphasize higher-level mathematics, science, literacy and problem-solving skills needed in the workplace and in further education.

Current Status

Directions: Place a check in the column under the number that best describes the degree to which the following indicators are in place.

1-Not Addressed 2-Planned 3-Early Stages of Implementation 4-Full Implementation

Policies and practices related to career/technical expectations for students.	**1**	**2**	**3**	**4**
All CT teachers provide a course syllabi that outlines state and national standards as well as expectations for quality student work.				
All CT teachers provide students with daily objectives that are communicated in the language that reflects state and national standards.				
Students are required to a performance test containing industry standards they had to meet to pass the test.				
All CT teachers create periodic assessments that are similar to assessments that students would have to complete to pass employability exams or gain employer certifications.				
CT courses advance technical literacy and provide students with structured activities that require reading and comprehending of technical manuals and related articles.				
Students read and interpret technical manuals **at least weekly** to complete CT assignments.				
Students have to complete writing assignments of 1 to 3 pages **at least weekly**.				
Students are required by teachers to include a list of books/articles, writing samples and (pictures of) products in a portfolio.				
Students prepare a written report or research study at least once each semester.				
CT courses advance technical numeracy by highlighting mathematics concepts and operations as they apply within learning units or modules.				
Students have to use mathematics to complete CT assignments **at least weekly.**				
CT courses highlight related science concepts as they apply within learning units or modules.				
Students are required to use technology to complete assignments or projects **at least weekly.**				
Students use a database or spreadsheet to complete an assignment or project at least **once a semester.**				
All CT teachers require students to complete challenging projects that integrate CT concepts with academic content **at least once a semester.**				
All CT teachers require students to complete quality homework assignments **at least weekly.**				

Directions: Check the appropriate column.	**YES**	**NO**
Do you disaggregate state assessment results in reading, mathematics and science for CT students?		
Are students required to meet standards on a written exam to pass the CT course?		
• Are one-third of the items are designed to assess student's ability to read (R), interpret and comprehend technical materials related to projects they have completed?	**R**	
• Are one-third of the items are designed to assess mathematics (M) related	**M**	

to problems studied in the classroom? • Are one-third of the items are designed to assess understanding of major technical concepts (CT) that are written in the language of state and national standards?	**CT**	
Does your center and/or state require each program to give CT exams, such as industry exams, state skill assessments, NOCTI, etc., to CT completers?		
Does each Career Pathway or program of study area track the percentage of students gaining certification or earning postsecondary credits annually?		
Do all CT programs have industry accreditation and offer students the opportunity to earn certification.		
Does each Career Pathway or program of study area have a local business advisory/steering committee?		
Are students required to produce a product and explain it?		
Are students required to present a report before a panel of judges?		
Does each Career Pathway or program of study area require students to complete a culminating senior project or senior portfolio?		
Each CT course has a mathematics-related textbook.		

Focus on CT Assessments

CT Assessments should focus on four major areas:

1. Technical processes and procedures

* can the student perform each major academic and technical competency required to complete the project according to established standards?
* does the student's product indicate the ability to apply technical proficiency to accepted standards?

2. Academic knowledge

* does the student possess critical knowledge about technical and related academic competencies used to complete the project?

3. Thinking and understanding

* can the student apply information, ideas and concepts with meaning and understanding?
* can the student make a written report and explain verbally what he/she has done and why?
* can the student analyze a situation and make appropriate decisions about it?
* can the student solve problems and give a clear rationale for what was done to solve them?
* can the student collect, synthesize and use information to complete the project?

4. Personal development

* is the student self-motivated and able to manage time?
* can the student work with and learn from others?
* does the student demonstrate honesty and integrity?

Career/Technical Studies
Specific Actions

Review the major actions for <u>Career/Technical Studies.</u> Brainstorm together the ones you might implement during years one, two and three. List specific implementation steps necessary to implement each major action.

Identify one outstanding practice that supports quality career/technical studies.
Major action to increase the percentage of students meeting the definition of CT completer.
Major action to increase the percentage of students earning certifications or postsecondary credits.
Major action to improve the quality of career/technical courses.

Work-Based Learning

Key Practice -- Enable students and their parents to choose from programs that integrate challenging high school CT studies and work-based learning and are planned by educators, employers and students.

Current Status

Directions: Place a check in the column under the number that best describes the degree to which the following indicators are in place.

1-Not Addressed 2-Planned 3-Early Stages of Implementation 4-Full Implementation

Policies and practices related to work-based learning:	**1**	**2**	**3**	**4**
Students received on-the-job training and rotated through several jobs or departments.				
Students received on-the-job-training where they observed veteran workers perform certain jobs.				
Students received on-the-job-training where they are taught how to do the work.				
Students work with employers to identify and develop good work habits.				
Students work with employers to develop good customer relation skills.				

Directions: Check the appropriate column.	**YES**	**NO**
Students' work-based learning experiences are connected to career goals.		
Classroom and work-site assignments are correlated to the career field.		
The center has established a set of standards and policies for work-based learning.		
A training agreement for each employer and student is in place.		
Someone at the center conducts regular site visits to monitor students' progress.		
Employers provide updates on student performance at least once a quarter (formal written progress report).		
Each student is required to develop an individual portfolio to showcase skills and experiences.		
Each student is required to keep a journal.		
Each student is assigned a work-site mentor.		

Work-Based Learning
Specific Actions

Review the major actions for <u>Work-based Learning.</u> Brainstorm together the ones you might implement during years one, two and three. List specific implementation steps necessary to implement each major action.

Identify one outstanding practice that supports work-based learning.
Major action to increase student access to work-base learning opportunities.
Major action to enhance the quality of work-based learning opportunities.

Guidance and Advisement

Key Practice — Involve students and their parents in a guidance and advisement system that develops positive relationships and ensures completion of a career/technical concentration with an approved sequence of at least four courses and an accelerated program of study. Provide each student with the same mentor throughout high school to assist with setting goals, selecting courses, reviewing the student's progress and suggesting appropriate interventions as necessary.

Current Status

Directions: Place a check in the column under the number that best describes the degree to which the following indicators are in place.

1-Not Addressed 2-Planned 3-Early Stages of Implementation 4-Full Implementation

Policies and practices related to guidance and advisement:	**1**	**2**	**3**	**4**
CT teachers work with feeder high school counselors to helps students see that they can complete both a CT concentration and a rigorous college preparatory program of studies in preparation for further learning.				
Middle school and high school teachers and students tour the Technology Center to better understand CT program opportunities.				
Technology Centers host community showcases to promote available programs of study and display student work for business leaders, community members, parents and students.				
CT teachers attend both high school and eighth grade registration events to promote program offerings with students and parents.				
CT programs have student scholarships sponsored by local employers.				
CT teachers know the graduation requirements for feeder schools and work with feeder schools to make sure students are on track to graduate.				
A teacher advisement system includes an annual meeting with students and parents to establish and review student college and career goals.				
There is an annual meeting with students and parents to discuss the student's plan of study for courses in both the high school and CT Center that maximize student opportunities for continued learning in college and careers.				
There is a process involving the CT center and feeder high schools to make sure students are enrolled in the proper mathematics and science courses.				
Someone is assigned to work with students to help them find scholarships for continued study and/or internships and work experience opportunities in the private sector that can support their continued learning.				

Directions: Check the appropriate column.	**YES**	**NO**
The CT Center has a brochure and other publications used to communicate CT program opportunities to potential students, parents, and others.		
The CT Center has a website that parents and students can access for information about programs and prerequisites for courses.		
The CT Center has a full-time guidance counselor or student personnel service person who works with feeder high schools and middle schools so that counselors and teachers at those schools know about CT program opportunities and course prerequisites.		
There are regular open houses at the CT Center for parents, students, and others to learn more from CT teachers and students about program opportunities.		

Guidance
Specific Actions

Review the major actions for <u>Guidance</u>. Brainstorm together the ones you might implement during years one, two and three. List specific implementation steps necessary to implement each major action.

Outstanding Practice that supports guidance and advisement
Major action to better help students plan and complete a coherent and rigorous program of studies that blends their academic coursework and CT coursework.
Major action to help students successfully transition to college and/or employment.

Extra Help

Key Practice -- Provide a structured system of extra help to assist students in completing accelerated programs of study with high-level academic and technical content.

Current Status

Directions: Place a check in the column under the number that best describes the degree to which the following indicators are in place.

1-Not Addressed 2-Planned 3-Early Stages of Implementation 4-Full Implementation

Policies and practices related to extra help and transitions:	**1**	**2**	**3**	**4**
Students are often able to get extra help from their without much difficulty when they need it.				
Technology Center has tutoring/extra help schedules posted.				
Teachers often set high expectations and are willing to help students meet them.				
Students may participate in credit recovery programs at the Technology Center so that they can graduate with their peers.				
Students use study teams to focus on reading and mathematics skills.				
The Technology Center provides a structured system of extra help to assist students who are not meeting standards.				
The Technology Center has created study sessions for state and national certification exams.				
The Technology Center works with local feeder high schools to provide summer camps. These camps have a career focus and enhance both literacy and numeracy skills of struggling students (9^{th} and 10^{th} graders).				
The Technology Center has a "Just in Time" tutoring program that provides academic support needed for success to learn a technical concept or skill.				

Directions: Check the appropriate column.	**YES**	**NO**
CT teachers use existing state assessments to analyze student preparedness for CT programs.		
CT students with reading and/or mathematics deficiencies receive special instruction to raise their knowledge/skill levels in these two areas.		
Teachers and Technology Center leaders have identified the academic skills that students need to be successful in a program of study and have communicated those to middle and high school teachers.		
The Technology Center administers a reading and mathematics assessment to interested students to determine if they have the skills necessary to meet with success in the CT program.		
Students who have deficiencies in reading and mathematics have the opportunity to attend a special summer school program designed to get them ready to succeed in the Technology Center.		

Our center has the following extra help strategies in place (check all that apply):

- ☐ Extended day—before and after school
- ☐ Peer tutoring
- ☐ On-line tutoring and computer-assisted instruction
- ☐ Just-in-Time tutoring
- ☐ Credit recovery classes
- ☐ Study teams
- ☐ Summer program
- ☐ Mastery learning

Extra Help
Specific Actions

Review the major actions for <u>Extra Help</u>. Brainstorm together the ones you might implement during years one, two and three. List specific implementation steps necessary to implement each major actions.

Identify one outstanding practices that support extra help.
Major actions to address the academic deficiencies of students who enter into CT programs (reading and mathematics).
Major actions to build a climate in which students help each other master the technical materials and the mathematical concepts needed to succeed at your institution.
Major actions to see that students are taking the right language arts and mathematics courses in their home school.

Transitions

Key Practice -- Provide a structured system of extra help to assist students in completing accelerated programs of study with high-level academic and technical content.

Current Status

Directions: Place a check in the column under the number that best describes the degree to which the following indicators are in place.

1-Not Addressed 2-Planned 3-Early Stages of Implementation 4-Full Implementation

Middle School/High School Transition	**1**	**2**	**3**	**4**
CT teachers meet with teachers from feeder middle grades or junior high schools annually to discuss expectations, content knowledge and performance standards for students entering the Technology Center.				
The Technology Center provides opportunitites for middle and high school faculty to visit the center.				
Middle and high school teachers work with CT teachers to review CT textbooks and sample reading and mathematics applications in CT courses.				
The Technology Center is effectively implementing a summer bridge program or CT camp for middle school students—exiting eighth-graders are identified to receive four to six weeks of supplemental instruction prior to high school.				
Teachers participate in required parent-teacher-student conference to plan or review the high school program of study (6 year plan) for every entering student.				
High School-Post High School Transition	**1**	**2**	**3**	**4**
The Technology Center works with the high school to administer postsecondary placement exams to determine which students are not ready for postsecondary study and uses the senior year to get them ready.				
Students performing below the state or national average on the ACT or SAT mathematics and verbal sections are required to take higher-level mathematics and English courses during the senior year.				
The Technology Center works with feeder high schools to decrease the percentage of students needing to take remedial or developmental courses in reading, language arts, writing or mathematics at the postsecondary level.				
CT courses are benchmarked to postsecondary standards.				
CT Teachers work with postsecondary institutions to develop articulation agreements so that CT courses offer postsecondary credit				
CT students who plan to directly enter the workplace have internship opportunities during the senior year with employers in the CT field who may have future job opportunities.				
Directions: Check the appropriate column.	**YES**		**NO**	
Are your students' ACT or SAT composite below, at, or above the district level? Where are the gaps? In content areas? Among subgroups?				
Are you aware of the remediation rate for your students who enter postsecondary institutions in your area? Where are the gaps?				
Are local employers satisfied with the knowledge and skills of Technology Center graduates?				
CT Students planning to enter directly into the workplace are prepared to pass employment and certification exams by the time they graduate or shortly thereafter.				
Do **all** programs of study provide students opportunities to earn articulated credit?				

Transitions
Specific Actions

Review the major actions for <u>Transitions</u>. Brainstorm together the ones you might implement during years one, two and three. List specific implementation steps necessary to implement each major actions.

Identify one outstanding practices that support extra help and transitions.
Major actions to provide students who meet college and career readiness standards to earn college credit during the senior year of high school.
Major actions to address the academic deficiencies of career/technical students the senir year who plan to attend college.
Major actions provide students planning to directly enter the workplace an opportunity to earn an industry-recognized certification that gives them a competitive edge in the labor market.

Climate for Continuous Improvement

Key Condition — A school director/principal with strong, effective leadership who supports, encourages, and actively participates with the faculty in implementing the key practices. The center sends a consistent message to students, families and the community about what is expected of students, teachers and administrators.

Key Practice - Use student assessment, program evaluation data, technology center performance reports, program enrollment, retention and placement reports, college remediation reports, student follow-up reports and advisory committee input to continuously improve culture, organization, management, curriculum and instruction to advance student learning.

Current Status

Directions: Place a check in the column under the number that best describes the degree to which the following indicators are in place.
1-Not Addressed 2-Planned 3-Early Stages of Implementation 4-Full Implementation

Policies and Practices related to Continuous Improvement:	**1**	**2**	**3**	**4**
The goals and priorities of the center are clear.				
The center maintains a demanding, yet supportive, environment that pushes students to do their best.				
Career/Technology **(CT)** teachers meet at least annually with teachers from their feeder high schools to discuss expectations, content knowledge and performance standards for students entering their programs of study.				
CT teachers meet at least annually with employers and postsecondary faculty to discuss expectations, content knowledge and performance standards for students completing a program of studies from the Technology Center.				
CT teachers and administrators have active advisory/steering committees for each program area to gain formal feedback that is used in making revisions to the curriculum.				
Teachers in each Career Cluster area meet at least quarterly to examine students' work to determine if it meets state or national standards.				
Center leaders use data at least every semester to continuously evaluate the center's academic and technical programs and activities.				
The director consults with staff members at least annually before making decisions that affect them.				
The director organizes study or focus teams that meet at least monthly to address how to implement the individual components of the campus improvement plan.				
CT teachers are continually learning and seeking new ideas on how to improve student achievement.				
CT teachers and center administrators work as a team to improve student achievement.				
CT teachers use data reports to continually evaluate the center's academic and technical programs and activities (these may include Asset, Compass or Work Keys results and student success on employer certification exams).				
Students' learning is measured through a variety of site-based and state assessments.				
Learning results are disaggregated by ethnicity, gender, socio-economic status, etc.				
Center graduates are tracked to determine the success of their coursework as they are engaged in future studies or employment.				

Continuous Improvement
Specific Actions

Explain how team leaders for each Focus Team will be selected.

Developing Focus Teams: Explain how team members will be assigned and who will be represented on each team. **All** faculty members should be a part of a team.

How will team membership be decided?

Who will be represented on:
Guidance (Building a Bridge from Feeder Schools):

Postsecondary Transition:

Data:

Quality Career/Technical Instruction:

Curriculum Alignment:

Other_____:

Which Focus Team will be responsible for analyzing, reporting and addressing the following gaps?

Achievement to standards:

Enrollment and completion in career pathways:

Classroom expectations:

Readiness for postsecondary studies and careers:

CT Programs and local employment data:

What will each focus team be expected to focus on for campus improvement?

Guidance (Building a Bridge from Feeder Schools):

Postsecondary Transition:

Data:

Quality Career/Technical Instruction:

Curriculum Alignment:

Organizing for Improvement

Overall Campus Improvement Committee members may include: System Administrator, Director, Lead Career/Technical and Academic Teachers, Representatives from Feeder High Schools, Post-secondary Educator, Business/Industry, Parents, Students, Focus Team Leaders

Overall Campus Improvement Committee				

Focus Teams

Each team should include a cross section of all faculty members (from a variety of program areas).

Guidance	Postsecondary Transition	Data	Quality CT Instruction	Curriculum Alignment

Priorities Action

Review the major actions developed by table teams. Choose the top priorities (Actions that can most impact achievement) for each year. **Use your current center improvement plan, state assessment data, TCTW Assessment data (if available) and Technical Assistance Visit Report (if available) to help determine priorities.**

1. Choose four- five major actions that can most impact student achievement to complete during **year one**.

Major Actions	Implementation Steps	Professional Development	Person(s) Responsible

2. Choose actions on which to work during **year two**.

Major Actions	Implementation Steps	Professional Development	Person(s) Responsible

3. Choose major actions on which to work during **year three.**

Major Actions	Implementation Steps	Professional Development	Person(s) Responsible

Staff Development Needed by Position—Please list additional groups for your Technology Center below the sample groups listed

Technology Center Groups	Year 1	Year 2	Year 3
Center Leadership Team			
Guidance Counselors			
Teacher			
Related Teacher			
Others			

Strategies to Share Information Learned

Develop strategies and timeline for sharing plans with the entire faculty and board of education. **Note: The faculty should review the plan and give feedback to the implementation team; revisions should be made and the final plan presented to the board of education and or the site-based council.**

Date	Person(s) Responsible	Strategies