



SREB

Case Study

Sussex Technical High School

Georgetown, Delaware

Students Thrive at a Comprehensive Technical High School Created from a Problem-laden, Shared-time Vocational Center

What does it take to turn a vocational center serving part-time students into a full-time technical high school offering a rigorous, integrated program of academic and career/technical studies to youth who make the choice to go there? It takes commitment from administrators, teachers, staff, students, parents and the community to initiate drastic changes aimed at preparing students for success in careers and in postsecondary studies.

Why Did Sussex Decide to Change?

Sussex Technical High School is located in Georgetown, in rural southern Delaware. When the school opened as a vocational-technical center in 1961, its mission was to serve part-time students from seven independent “feeder” school districts. By the mid-1980s, the serious flaws in this delivery system had become obvious. For example:

- Enrollment at the school declined 45 percent between 1978 and 1988.
- Teachers were being laid off because they were no longer needed.
- Students from the feeder high schools had low-level academic skills and were unable to relate their academic studies to the workplace.
- Students scored in the lowest quartile in the state on standardized tests.
- The school calendars and bus schedules of seven feeder districts resulted in scheduling “nightmares” at the center.
- Vocational-technical education at the center had fallen out of step with what business and industry leaders expect of their employees.

A massive reform effort began in 1988. The first step was to organize an advisory committee to seek answers to the center’s problems. This group of 30 people included school superintendents, key staff members, policymakers and representatives of business, industry and the community.

As Sussex Tech sought to change its way of doing business, it used frameworks provided by the Southern Regional Education Board-State Education Consortium. *High Schools That Work* provided technical assistance, and Sussex Tech teachers and administrators attended the 1989 *HSTW* Summer Staff Development Conference. Delaware educators visited *High Schools That Work* sites to learn how other schools were implementing the *HSTW* key practices. When Delaware joined the SREB-State Education Consortium in 1990, Sussex Tech gained additional access to data and information.

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A New Technical High School

In September 1991, Sussex Technical High School opened its doors as a newly designed, comprehensive facility for students in grades nine through 12. The new school offered innovative concepts such as block scheduling, common planning time, structured programs of academic and technical study, career majors, a strong and relevant academic program and an integrated curriculum.

Students from 10 public middle schools, five private schools and one charter school in Sussex County choose to attend Sussex Tech. The school prides itself on having a dedicated faculty, challenging academic and technical programs of study, strict disciplinary guidelines, school-wide technology and a clean, well-maintained campus.

Enrollment at Sussex Tech has risen dramatically from 509 students in 1991 to 1,207 students in 2002-2003. Almost 600 students apply for only 300 openings each year. The school maintains balance by selecting certain percentages of students from each feeder school and by making sure the school population reflects the racial and ethnic makeup of the general population. Seventy-seven percent of the students are White, 19 percent are African-American, and the remaining four percent are Hispanic, Native American and Asian. Thirteen percent of students are special education and 23 percent qualify for free or reduced-price lunches.

A One-track School

By blending the essential content of traditional college-preparatory studies — mathematics, science and language arts — with quality career/technical studies, Sussex Technical High School strives to prepare all students for postsecondary education and careers. There is no “general track.” A highly structured and sequential program of study ensures a rigorous academic curriculum linked to industry-based technical studies. Every student selects and completes a technical concentration and receives instruction throughout the curriculum in the higher-order thinking and problem-solving skills that lead to effective transitions to postsecondary education and careers.

All Sussex Tech students:

- achieve high levels of academic and technical skills;
- prepare for postsecondary education and a career;
- learn in the context of a career concentration;
- learn by doing — in the classroom and the workplace;
- work with teachers in small clusters or “schools within schools;”
- receive extra instructional help and extended learning time;
- have access to a wide range of information on careers and postsecondary education;
- use technology to strengthen learning; and
- benefit from strong school ties with postsecondary institutions and employers who provide work-based learning opportunities.

Three major changes enabled Sussex Tech to avoid a “general track.” They include:

- developing a challenging program of study;
- organizing the school around career clusters; and
- integrating academic and technical content and instruction.

Graduation Requirements and the Academic Core

In 1991, Sussex Tech upgraded its graduation requirements in English, mathematics and science to reflect the *HSTW*-recommended curriculum for students in grades nine through 12. The recommended curriculum included:

- **Four credits in English courses with content equal to that of college-preparatory English.** These courses emphasize proficiency in reading, writing, literature and higher-order thinking skills. To bolster their language arts skills, students participate in integrated activities throughout the curriculum, including conducting research, writing reports, making oral presentations and completing book reports.
- **Three credits in mathematics, including two credits in courses with content equal to college-preparatory mathematics.** Initially ninth-graders took Algebra I, Geometry or Applied Mathematics I. Other mathematics courses included Applied Mathematics II, Algebra II, Pre-calculus and Calculus.
- **Three credits in science, including two credits in courses with content equal to college-preparatory science.** Courses included Biology (Applied Biology-Chemistry), Chemistry, Advanced Chemistry, Anatomy/Physiology, Physics I and II and Principles of Technology I and II. Principles of Technology — an applied Physics course — required higher-order thinking skills and incorporated real-life technical applications. Students’ technical programs dictate the science sequence, but most students take additional science courses as electives. Modern, well-equipped science labs provide opportunities for students to conduct research and solve problems.
- **Three credits in social studies, including U.S. History and Economics in the upper grade levels.** Initially in 1991, Sussex Tech required 22 1/2 credits for graduation. Adopting an eight-period schedule has enabled Sussex Tech to phase in its graduation requirements to 28 credits for the Class of 2007. At the onset of Sussex Tech’s school improvement effort, six credits in a career-technical major were required for graduation. All Sussex Tech students in the class of 2007 will be required to complete 10 technical credits to successfully earn a diploma.

School leaders and teachers view their curriculum as something that must be improved regularly. They do not believe that their students’ performance has reached its full potential. Over the past five years, school leaders and staff have undertaken a major effort to strengthen what is taught by reviewing all courses to identify areas of weakness. They have developed a common template for all teachers to follow in revising their course syllabi and in developing new courses. The syllabus for each course addresses the following elements: a course description; textbook/references; the date of the last course revision; major course objectives; student performance objectives; integrated projects/activities and subject areas; classroom expectations and requirements; classroom procedures and rules; policies for homework, grading, doing make-up work and using the Internet; and how state standards are integrated into the curriculum.

Changes in Graduation Requirements at Sussex Technical High School

Class of 1991		Class of 2007	
4	credits in college-preparatory English	4	credits in college-preparatory English
2	credits in mathematics, including two in college-preparatory-level courses	3	credits in mathematics, including two in college-preparatory-level courses
2	credits in laboratory science	3	credits in laboratory science, including two in college-preparatory-level courses
3	credits in social studies, including U.S. History and Economics	3	credits in social studies, including U.S. History and Economics
1	credit in physical education	1	credit in physical education
.5	credit in health	.5	credit in health
6	credits in a technical pathway (concentration)	10	credits in a technical pathway (concentration)
4	credits in elective courses	2.5	credits in elective courses
		1	credit in computer literacy
22.5 total credits		28 total credits	

School leaders held teacher focus groups and analyzed state testing data, common assessments developed at the school, the *HSTW* assessment and teacher survey results to determine the gaps between what they were teaching and student achievement. Teachers in all areas determined that they needed to revise their curricula. **This led to teachers agreeing to develop a curriculum scope and sequence for each program area and common course evaluations and assessments, including common end-of-course tests for all courses in most departments.** Over the past five years, teachers have rewritten the entire four-year English and social studies curricula. Science teachers are field testing a revision of the first two years of the science curriculum. Teachers have even revised the special education curriculum to be parallel to the regular education curriculum in mathematics, English, social studies and science.

Mathematics teachers have upgraded their curriculum twice, finally replacing the entry-level Applied Mathematics course with Algebra I. Every freshman entering the school must enroll in either Algebra I, Algebra I Plus or Geometry. Students must take Algebra I Plus if they did not score at the proficient level on the state's eighth-grade mathematics exam. **Compared to the 45-minute Algebra I course, Algebra I Plus is a 90-minute course in which students study the same content and are held to the same standards, but receive extra help to meet those standards and expectations.** According to Sandra Faletok, Director of Instructional Services for the Sussex Technical School District, "These changes have enabled the school to teach challenging mathematics to entering freshmen."

"At Sussex Tech, data analysis and curriculum revision are ongoing and never-ending processes. It is a journey, not a destination," said Faletok. "The day that you stop doing curriculum revision is the day your school stops moving forward."

To facilitate the push to revise the curriculum for continual improvement, in 2002 Sussex Tech moved from a seven-period schedule to an eight-period schedule, with 85-minute periods. **School leaders need scheduling flexibility to provide students extra instructional time and remediation during the school day.**

For instance, the Algebra I Plus course for certain incoming ninth-grader is a “double-dose” algebra course taught over a two-block period. The new schedule also enables the school to expand its offerings in the visual and performing arts to meet State Department of Education requirements and to meet students’ demand for band, chorus and junior ROTC courses. The move to an eight-period block schedule has enabled Sussex to expand its curriculum without weakening academic and technical course offerings.

The Revised Career/Technical Curriculum

Sussex Tech leaders and teachers reviewed their career/technical offerings and realized their courses also needed to be upgraded. Initially, Sussex Tech students had to earn at least six credits in a career/technical major in one of 15 areas within four demanding career clusters: Automotive Technologies, Communications and Information Technologies, Health and Human Services Technologies, and Industrial/Engineering Technologies. Incoming students are now required to complete 10 courses in a concentration to build broader and deeper knowledge and skills in their field.

School leaders realized that the changing workplace necessitated a revision of the career clusters and majors. For example, due to an increased focus on communications, electronics was moved from the Industrial Engineering cluster to the new Communications and Information Technologies cluster and added Media Broadcasting Communications as a major. Sussex Tech’s current cluster structure includes:

Automotive Technologies

- Auto Body
- Auto Diesel

Communications and Information Technologies

- Computer Information and Business Systems
- Digital Publishing and Print Design
- Electronics/Computer Systems
- Media Broadcasting Communications

Health/Human Services Technologies

- Athletic Health Care
- Children’s Education and Services
- Cosmetology
- Criminal Justice
- Health Professions

Industrial/Engineering Technologies

- Carpentry/Mill and Cabinet
- Computer-aided Drafting and Design
- Electrical
- Environmental

Industry standards have become the basis for the technical curriculum. For example, Associated General Contractors certifies the carpentry program; Automotive Service Excellence certifies the auto diesel program; the National Institute for Automotive Service Excellence and the National Automotive Technicians Education Foundation certify the Auto Body program; and the Computer Technology Industry Association (CompTIA) certifies the electronics/computer systems program. Cosmetology and health professions students are expected to meet industry standards for state certification and licensure requirements, and electrical trades is an approved state-apprenticeship program.

Sussex Tech also prepares students for the advanced courses required by two-year and four-year colleges. **Through the *Tech Prep* programs, students successfully meeting designated course requirements can receive college credit at seven different colleges and universities.** The courses for which Sussex Tech students can receive college credit include Auto Body, Auto Diesel, Computer Information and Business Systems, Electronics/Computer Systems, Media Broadcasting, Children's Education and Services, Criminal Justice, Health Professions, Computer-Aided Drafting and Design, Electrical Technologies and Environmental Technology. Sussex Tech continues to develop additional educational partnership agreements. For a complete description of all courses offered at the school, go to the Program of Studies on the Sussex Tech Website at http://www.sussexvt.k12.de.us/web/info_inc.cfm?LNK=aaa.html.

Strategies for Achieving the Vision

In converting to a full-time technical high school that focuses on continued improvement, Sussex Tech uses a number of strategies and structures that support its efforts to raise standards and achievement.

School Organization

In converting to a full-time technical high school, Sussex Tech leaders have found that organizational improvement is essential for continual success. Communication and coordination among teachers and students is a priority. The school has reorganized time for teachers to work together to improve student learning by establishing regular times for common planning, cluster meetings, faculty councils and curriculum content meetings.

Common planning time gives teachers a chance to work together to plan joint assignments. Block scheduling has facilitated this opportunity for academic and technical teachers to meet (grouped by the school's four clusters) at 7:55 a.m. for 30 minutes before students arrive. This daily common planning time enables academic and technical teachers to share curricula and plan integrated projects.

Career/technical cluster meetings enable academic and career/technical teachers, librarians, counselors, special education teachers and school administrators to discuss and plan improvements to each cluster area. Similar career programs at the school are grouped into technical clusters, with each cluster having a complete team of teachers who work together as a single unit to motivate and educate their students. For example, the industrial/engineering cluster consists of staff in the following areas: carpentry/mill and cabinet, computer-aided drafting and design, electrical, environmental, English, mathematics, science, social studies and special education teachers; a counselor; an assistant principal; and other teaching and support staff. Each cluster has two cluster managers who are elected by their peers. Each manager represents the academic or the technical side of a cluster. Cluster managers facilitate the ongoing improvement and implementation of integrated curriculum, instruction and overall school improvement efforts. Cluster managers also meet with school district administration twice a month to discuss school improvement efforts.

The faculty council consists of 13 teachers elected each year to meet for at least three days during the summer and periodically throughout the year to analyze data and develop a school-improvement plan for the upcoming school year. Over the past several years, faculty council members have analyzed student attendance, state and *HSTW* test data, curriculum integration, grading policies and classroom accountability agendas. These improvement efforts are supported by in-service and professional development programs throughout the year. In 2002, the faculty council decided to address mathematics and writing across the curriculum and then have cluster and content leaders facilitate the implementation of these two initiatives. Faculty councils are an important way to empower teachers to engage in school improvement. “At Sussex Tech, teachers feel that accountability and assessment are within their power and control,” said Faletek.

Content meetings allow English, mathematics, social studies, science and other content area teachers to meet at least once a month within each discipline. They review and evaluate the content being taught to ensure that all teachers are covering the same material in courses having the same title. Teachers of common courses meet to identify the strengths and weaknesses of the curriculum and to discuss how to improve it.

A teacher from each academic content area serves as a content specialist who helps technical teachers establish goals and develop applied and integrated lessons. These content specialists mentor teachers, analyze data and recommend curriculum changes. They also identify best teaching practices and share them with colleagues.

Sussex Tech is achieving its vision by encouraging collaboration and collegiality among teachers and school and district administrators. The fact that teachers work as a team, rather than as individuals, has positively affected the entire school. “The school organization provides multiple opportunities and venues for teachers and staff to interact on issues related to students’ performance, curriculum and assessment,” said Falatek.

Curriculum Integration

By teaching all students a challenging academic core, Sussex Tech has made curriculum integration a priority at all grade levels and across all programs. Methods, such as scientific inquiry and reading, writing and mathematics across the curriculum, connect coursework to real-world problems, issues and projects. Each grade level uses integrated projects; ninth-graders explore careers in six technology programs, and 11th-graders complete comprehensive individual projects. For example, students in the Industrial/Engineering Technologies cluster apply what they learned about the American Revolution in history class and the skills they learned in mathematics class to recreate 18th century furniture and tools.

The administration requires technical teachers to have students demonstrate academic skills in their classes. School leaders support these teachers in integrating academic content and skills into career/technical courses by:

- providing teachers with special materials and professional development on getting students to use reading, writing, mathematics, social studies and science skills to complete assignments;
- expecting technical teachers to address state academic standards in their courses;
- enabling academic and technical teachers to become familiar with the content and goals of each other’s classes had allowed them work together to revise and plan their curriculum and instruction around a common theme; and
- organizing opportunities for technical and academic teachers to do internships in the workplace to learn how the industry’s skill requirements are changing and to develop ideas for curricula, integration and classroom projects that will prepare students to meet employers’ needs.

This integration approach culminates in the mandatory Sussex Tech Exhibition of Mastery. Twelfth-graders develop and present an integrated project representing advanced academic and technical skills. Working individually or in teams, students conduct research, develop a product related to their technical major, write a related research paper and make an oral presentation. The report and the oral presentation are evaluated by a committee of administrators, teachers and advisory council members. If students work together, each team member must focus on a different aspect of the project in the written and oral reports.

Past senior projects include:

- Social and Emotional Development of Toddlers
- Society's Effect on the Development of Serial Killers
- Recovery Plan for Osprey and Delmarva Fox Squirrel
- How Advertising Affects Teenagers' Spending
- Raising Calves — Proper Medication Administration Techniques
- How Documentaries Differ from Motion Pictures
- Fiberglass and Rust Repair
- The Entrepreneurship Exhibition
- Fungus Caused by Artificial Nails
- Nutrient Runoff and the Chesapeake
- Rat Intelligence in Comparison to Mouse Intelligence
- Evolution of the Alphabet
- The Effects of Exercise on the Normal Cardiac Function of the Heart

Although students may be apprehensive at first, they find great satisfaction in completing the Senior Exhibition of Mastery. "The project gave me a chance to showcase many of the skills I have learned in my technical major," one student said. "Getting organized and meeting deadlines are things I will be expected to do in the workplace," another student noted. All Sussex Tech graduates agree that the senior project is the thing that most prepares them for success in college.

At Sussex Tech, integration is not merely a capstone experience, teachers work constantly to integrate the day-to-day curriculum. Examples of recent projects include:

- Chemistry students investigating forensic evidence of a crime and joining the Criminal Justice class for a mock trial of the indicted person(s).
- Students in the Industrial/Engineering cluster constructing a house. Carpentry students build the frame and other wood parts. Electrical students add the wiring, and other students install the plumbing. All students use mathematics to calculate the quantities and costs of materials. In partnership with Habitat for Humanity, the project not only teaches technical skills, but also helps students learn the value of community service.
- Auto Body and Auto Diesel students writing daily journals in their technical classes, and later, as an English assignment, compiling their daily writings into a formal journal. Their journals reflect the work done for the marking period, interpersonal workplace skills and the application of mathematics and science concepts. Examples of science and mathematics integration that students have described in their journals include determining horsepower and velocity, measuring frames for auto body repair, estimating

costs, calculating final costs, using ratios for mixing reducers and other chemicals in paints, determining voltage and measuring for the construction of a battery box.

- Students in mathematics and science classes analyzing data with life-or-death results. They compare the data of premature babies who have lived with those who have died of respiratory distress during clinical trials of an ECMO heart/lung by-pass machine conducted in Great Britain.
- Students in English class writing a grant to the MBNA Corporation arguing the need for a Lamborghini motor to be used by the students in Auto Body Technology. Besides proper grammar and style, the grant also required specific information about cost and usage. The students did such a fine job with the grant writing that the MBNA Corporation awarded Sussex Tech \$22,315 to purchase the Italian sports car motor.

All teachers at Sussex Tech are dedicated to creating integrated projects that provide practical, meaningful experiences and that focus on the need for challenging and relevant academic and technical coursework. The school's philosophy is that achievement will increase if all staff use integrated projects to help career-oriented students learn abstract concepts by solving real-world problems.

Teacher Support for High-level Content

Many students need to be motivated by teachers to undertake the hard work of learning challenging academic and technical content. In the beginning, Sussex Tech leaders faced a major hurdle: How could they get all teachers to recognize that students are capable of mastering higher-level content? School data has shown, however, that most students can reach higher levels. "In the process, teachers learned that it is very important to continually analyze the data to find the strengths in the curriculum and what areas need revision," said current principal Sandra Walls-Culotta.

Because Sussex Tech did not offer academic studies until the school was re-designed in 1991, administrators were able to recruit academic teachers who believe in and are dedicated to a curriculum of high standards and integrated learning. Technical teachers adopted a "go for it" attitude when they realized that the school could not continue down the same old path. By embracing industry certification standards, they reinforced the value of a Sussex Tech diploma.

Patrick Savini, Sussex Tech's first principal and current Director of Support Services of the Sussex Technical School District, lists three major reasons for teachers' initial and strong support of improvement efforts: "We adopted block scheduling, gave teachers opportunities to plan integrated activities and made it possible for the faculty to participate in meaningful professional development activities, including the annual *High Schools That Work* Staff Development Conference," he said.

To meet student achievement goals, school leaders provide quality professional development opportunities for all staff that will enable them to develop instructional programs to meet the new state content standards. Programs range from staff development conferences to computer training to assessment training. Other activities include *HSTW* networking activities within the school and with colleagues at other schools.

- **In-house:** Professional development is embedded in the school's schedule. Clusters and content meetings provide professional development that is ongoing and job-specific. Additionally, clusters enable cross-curricular integration to occur. Finally, common planning time enables professional development follow-up on a daily and weekly basis. "It is very important also to have time included in the program's schedule for the staff to work together and develop relationships," added Principal Walls-Culotta.

- **External:** Sussex Tech takes full advantage of state and national professional development opportunities. Technical staff remains abreast of industry standards and innovations by participating in summer business internship experiences in appropriate certification programs (i.e. AYES). Academic staff also participates in summer business internship experiences and attends state benchmarking workshops.
- **HSTW Networking:** Sussex Tech staff members are active participants in *HSTW* professional development conferences. The school sends 10 to 20 staff members to the *HSTW* Annual Professional Development Conference and other staff to selective *HSTW* workshops. The networking provided by *HSTW* has led to the school hosting educational delegations from 33 states, 11 countries and Washington, D.C. Not only do visitors benefit from Sussex Tech sharing its school improvement efforts and best practices, but Sussex Tech staff (teachers and administrators) benefit by learning from other educators throughout the United States and the world.

Sussex Tech has also recognized that professional development activities such as attending the *HSTW* Conference and faculty council workshops are opportunities to promote team building, collegiality, collaboration and a common vision, which are all vital to comprehensive school improvement.

Student-centered Learning

Sussex Tech students benefit from classroom practices that engage students in actively learning academic and technical content. Since academic and technical classes are organized within cluster areas, most students attend classes with their “cluster mates” and have the same academic and technical teachers throughout high school. This helps create a rapport between students and teachers and allows closer monitoring of student progress. It also encourages academic and technical teachers to work together to develop joint assignments and to guide students in carrying out their senior projects.

There are no study halls. Every minute of a student’s school day is spent in active learning. Administrators believe that the fewer teacher preparations there are, the more teachers can concentrate on content. Consequently, the majority of academic teachers teach two different courses, thus limiting the number of preparations they have to make each day.

Extra Help for Student Success

When Sussex Tech converted to a full-time high school with high standards for academic and technical studies, school leaders found that many students needed support in meeting those standards. Leaders created two courses — Techademic Coaching and Techademic Reading and Writing — to strengthen students’ academic skills and required all ninth-graders to take the reading and writing course.

- **Techademic Coaching** provides tutoring to any student needing assistance or desiring enrichment in the following areas: mathematics, science, English, social studies, Spanish, library skills, research skills, business/computer technology, keyboarding/computer skills, Scholastic Aptitude Test (SAT) preparation and Preliminary Scholastic Aptitude Test (PSAT) preparation. This after school program provides computers and transportation home to convenient drop-off points in the county. All students are encouraged to take advantage of this opportunity. Techademic Coaching during 2001-2002 logged more than 5,716 student visits, including 1,617 requests for assistance in mathematics, 723 in business/computer technology, 578 in science, 1,890 in English and 332 in social studies.

- **After-school Extra-help Classes** provide additional instructional time in reading, writing and mathematics for ninth-and 10th-graders as part of individual improvement plans tied to Delaware Student Testing Program (DSTP) assessments. Separate classes for each grade level and each content area help students to strengthen areas of weakness.
- **Techademic Reading and Writing** were initially for ninth-graders, but school leaders found that some 10th-graders also needed to continue strengthening their reading and writing skills and split the Techademic Reading and Writing into two separate, one-half credit courses — one for ninth-graders and another for 10th-graders.
- **Techademic Reading and Writing 1** helps ninth-graders who score below standards (performance level 2) on the reading portion of the eighth-grade DSTP assessment improve their reading and writing skills. The school diagnoses students’ strengths and weaknesses and develops appropriate lessons to meet individual and whole-group needs.
- **Techademic Reading and Writing 2** helps advance the reading and writing skills of 10th-grade students who score “unsatisfactory progress” or “progress warning” on the reading portion of the ninth-grade DSTP. Teachers use strategies that help students comprehend materials used in their academic and technical classes.

Individual Improvement Plans

The school involves parents in the process of planning extra help for students who enter the school performing below standards in mathematics and/or reading. School leaders determine the type of extra help the student needs and prepare a plan describing the type of help, when the student should receive it, and what the student needs to do to meet standards on the state test. Parents review the extra-help plan and agree that they support the school in carrying it out.

- **Individual Educational Plans (IEPs) for Special-Needs Students.** Sussex Tech uses a team approach to offer supplemental support to exceptional students. Since the school’s philosophy is to include all students in mainstream instructional programs whenever possible, special education (shared approach) teachers provide help and support in the regular academic classes. Traditional special education services are also provided for students whose IEPs recommend this level of service. Shared approach and special education teachers who support exceptional students meet weekly to develop and assess common goals and standards.

In addition, all staff is actively involved in students’ progress. Teachers constantly communicate with families through “concerned” or “good job” postcards and phone calls. “We want to recognize all problems and concerns while there is still time to do something about them,” said Principal Walls-Culotta. “It is a team effort; everyone must be involved.”

A Comprehensive Guidance System

A comprehensive guidance and advisement system is critical to a structured program of study. Sussex Tech’s guidance staff has developed a system that includes:

- hosting school tours for eighth-graders;
- conducting an open house event for parents whose children are considering applying to Sussex Tech;
- hosting an eighth-grade parent night for parents whose children have been accepted to Sussex Tech;

- using interest tests and technology exploration courses to help ninth-graders choose a technical major;
- conducting home visits to all incoming ninth-graders so parents learn about the school's academic, technical and behavioral expectations;
- helping all students plan a coherent program of study and reviewing it annually;
- orienting middle-school students to the Sussex Tech program of study. (In 2002, ninth-graders at Sussex Tech began the school year two days before upperclassmen. This allows freshmen to become familiar with the campus, school policies and procedures, and their schedules before hundreds of upper-class students crowd the halls.);
- hosting an open house to allow parents to tour the campus, meet their child's teachers, ask questions and receive a personal evaluation of their child's progress; and
- monitoring student progress to determine if additional help is needed.

Counselors assign ninth-graders to mathematics courses based on state testing and eighth-grade mathematics performance. Academic courses are linked to students' technical interests and set the pace for a four-year program of study. "The guidance staff does a lot more personal counseling now, not just focusing on a career but also on what academic path students must follow for college," said John Sadowski, director of student services.

All ninth-graders participate in a comprehensive career exploratory program during which they investigate six different technical majors for four-and-a-half weeks. They:

- learn about opportunities related to career majors;
- become familiar with specific equipment and technologies;
- complete integrated hands-on tasks related to a career pathway;
- take notes and complete a career research paper; and
- work on a career portfolio.

While exploring technical majors, students complete a series of interest inventories. The results of these assessments are placed in their portfolios, along with teacher evaluations of students' rotations through the technical majors. Students, parents and counselors use this information to select a career major for the student to pursue in high school.

Assistant Principal/Counselor Teaming

A team comprised of a counselor and the assistant principal provides additional support for students. The assistant principal/counselor team works with the same group of students for four years in a proactive approach to help students succeed at Sussex Tech. Student conferences, scheduling and attendance are a team effort between the student, parents, counselor and assistant principal.

Student-assistance Team

Sussex Tech's student-assistance team is made up of the three school counselors, a technical teacher, an academic teacher, an assistant principal, the school psychologist, the school nurse, the social worker from the Wellness Center, the student-assistance team assistant and the school resource officer. The team meets on a

monthly basis to review students who are not succeeding and to make recommendations to help them. The team helps students face learning, attendance, discipline, economic, family and mental health problems. A case manager provides follow-up for students and assists in making sure recommendations are followed.

Creating a Climate Conducive to Learning

A major goal of the Sussex Technical School District is to create a climate conducive to learning by operating a consistently safe and drug-free school. District leaders believe a positive climate for teaching and learning is essential for students to reach high achievement standards. To help reach this goal, Sussex Tech has a carefully structured and enforced school disciplinary policy and has implemented a number of assistance programs. An on-site Wellness Center providing comprehensive adolescent health care is available to students who obtain a signed parental consent form. Eighty-nine percent of the school's student population is enrolled in the Wellness Center. A school resource officer, the dean of students and an intervention specialist take a proactive approach in providing a safe learning environment. Staff can refer students to a designated person for initial counseling and information on counseling treatment.

Community Support

Sussex Tech is fortunate to have strong support from local business and industry leaders. As the school raised standards and expectations, employers proved to be a valuable resource in identifying curriculum areas that coincide with the knowledge and skills needed in the workplace. Business involvement at Sussex Tech consists of the following:

- **Advisory Committees:** Business leaders serve on various advisory committees related to the technical majors at Sussex Tech. These individuals provide ideas on how to improve the curriculum, equipment and technology.
- **Business Internships for Students:** Each year about 90 students do business internships that provide on-the-job training coordinated with classroom learning. Students may have an internship for a semester or for the entire year. Employers provide on-the-job training in occupations directly related to the student's career/technical education program of study. Each student intern is guided by a technical teacher and must keep a daily journal on what he or she is learning.
- **Summer Internships for Students:** Each year about 45 10th- or 11th-graders have summer internships. Students must each work a minimum of 135 hours during June, July and August in a job related to their technical majors. Upon completion of all required assignments, the student is awarded one-half credit.
- **Summer Internships for Teachers:** Local businesses typically employ from six to 10 Sussex Tech teachers for two weeks each summer. This gives technical and academic teachers a chance to establish connections to businesses in their field and to learn about business practices, technology, and skills and expectations of the field. To complete the internship, teachers must develop lessons with "real-world" applications they can use at school. Approximately one-half of the teachers have participated.
- **Job Shadowing:** All students in grades 10, 11 and 12 have the opportunity to spend a day or part of a day observing and learning from a professional in their selected career fields. Students meet and talk to professionals to gain a better understanding of the academic and personal characteristics necessary for success.

- **Senior Project Evaluations:** All seniors are expected to demonstrate advanced academic and technical skills by developing and presenting an integrated “exhibition of mastery.” Students must design a significant product in their technical area, use advanced technical skills, complete a formal research paper and give an oral presentation evaluated by a diverse committee of administrators, teachers and representatives from the business community.
- **Guest Speakers:** Community leaders frequently speak about job opportunities, career paths, the work environment and critical skills for success and advancement.
- **Judges:** Sussex Tech students are actively involved in co-curricular student youth organizations (Business Professionals of America, Distributive Education Clubs of America, Future Farmers of America, Junior ROTC, JDG and Skills USA Vocational Industrial Clubs of America). Various competitive events are held at the school and are judged by individuals from the business community.
- **Donations:** Individuals and businesses have given equipment, supplies and materials for classroom use; money for student scholarships and awards; and money to the school’s non-profit educational foundation established in 1993 to provide for the long-term needs of career/technical education in Sussex County.

Challenges in Converting the School to a Full-time Technical High School

Sussex Tech faced two major challenges in converting from a part-time vocational center to a full-time comprehensive technical high school: getting approval from the State Board of Education and winning the support of the State Legislature for a tax increase to support the new endeavor.

The approval process took two years and involved numerous presentations of why the change was needed, what it would entail and how it would be accomplished. “We wanted Sussex Tech to become a school that would demonstrate for the state and the nation that career-oriented students can excel in an environment of rigorous academic and technical studies,” a former superintendent said.

Construction and Resources

While the superintendent and the school board were seeking approval and funding for the new school, district leaders were making plans to meet other challenges. The original school building was too small to handle projected increases in enrollment. The 1960s classrooms seated only 15 or 16 students; the cafeteria was too small; and there were no science laboratories or library. The existing school lacked athletic facilities, such as a gym or a football field, which would encourage students to choose Sussex Tech as their high school. The increased enrollment from 509 in 1991 to 1,207 in 2003 has resulted in the need for even more facility expansion. The district added a new wing in 2001 to house 20 additional classrooms and a new library, built with state-appropriated funds. Sussex Tech continues to upgrade its technical labs and has recently remodeled the labs for the Computer-Assisted Drafting and Design, Carpentry, Cosmetology, Criminal Justice, Early Childhood Education and Electronics programs.

The district receives funding from federal and state programs. District leaders have requested and received competitive grants from the MBNA Corporation and TechPrep to achieve goals in the following areas: student achievement, quality curriculum and professional development; integration of academic and technical studies; parental and community involvement; safe and drug-free schools; and vocational program equity and access.

Maintaining High Standards

School leaders underestimated the resistance of students who were accustomed to low expectations and a smorgasbord of “dumbed-down” courses. By January 1992, the failure rate of students in Applied Mathematics courses reached an alarming 60 percent. During the spring and summer of 1993, many 12th-graders decided to return to their former high schools rather than complete Sussex Tech’s tough curriculum. It took about two years of “drawing the line in the sand” to get students to recognize that they were going to have to work hard — with no study halls — to meet higher standards. Now, most students see the importance of completing a challenging program of study and decide to remain at the school.

Another obstacle in the beginning was the school’s reputation as a place to send special education and low-achieving students for easy credit. Sussex Tech addressed this problem by “mainstreaming” these students and providing them with extra help in coursework and special projects. **The school’s philosophy is to hold all students to high standards and offer supplemental support for exceptional students through a team delivery system called “Shared Approach” instruction.** Special education (Shared Approach) teachers are scheduled to teach along with content teachers (mathematics, English, science, etc.) to support students in need. At Sussex Tech, less is not expected of special education students. Standards remain high. There is no place to hide,” said Falatek.

Sussex Tech recognizes that today’s employers rate attendance and dependability as two critically important attributes for employment and career success. School leaders believe a positive work habit displayed at school will accompany graduates into the world of work and that good attendance habits learned in high school lead to good attendance habits at work and increase job success. Additionally, high quality education does not matter if students are absent and do not take advantage of the opportunity for integrated learning. Therefore, strict attendance guidelines are enforced. The school leadership installed an automated calling system, sending mailings to parents and eventually sending a registered letter. As a result, attendance rose, which has helped improve achievement. The average daily attendance in 2001-2002 was 95.6 percent.

Getting Results From Higher Expectations and Standards

The *High Schools That Work* assessment has been an important barometer for gauging progress toward greater educational attainment. When Sussex Tech students took the *HSTW* assessment tests in reading, mathematics and science for the first time in 1990, these part-time students were still studying academic subjects at their home high schools. The scores were depressing: Sussex Tech’s career-oriented 12th-graders had lower reading, mathematics and science scores than students at any of the 37 other high schools participating in the *HSTW* initiative. In the 1993 assessment, the school received special permission to test 11th-graders as well as 12th-graders to compare the effects of full-time versus shared-time instruction. The 11th-graders scored well in comparison to 12th-graders who took the tests at other *HSTW* sites. However, after studying the data since 1991, the success of integrated learning and high-level academic expectations for all students at Sussex Tech is becoming more and more evident. Improvement in test scores has continued, and Sussex Tech students greatly exceeded reading, mathematics and science goals on the latest assessment (2002). (See Table 1.)

Table 1
Comparison of *HSTW* Assessment¹ Scores for Career/Technical Students At Sussex Tech

	1993	1996	1998	2002	High-scoring sites	<i>HSTW</i> Goal
Reading	262	274	274	299*	292	279
Mathematics	276	287	300	316*	312	297
Science	275	280	289	311*	308	299

Note: All scores are based on a scale of 0 to 500 and are rounded to the nearest whole number. High-scoring sites are a group of schools whose assessed students were similar in ethnicity and parental education level to the assessed students at Sussex Tech and were ranked by mean scores in the top 15 percent for two or three of the subjects.

* In 2002, Sussex Tech students exceeded the *HSTW* goals and the mean of high-scoring *HSTW* schools in all tested academic areas. The school's mean reading score of 299 is at the midpoint between the proficient and the advanced level. The mean mathematics score of 316 is at the midpoint between the basic and the proficient level for mathematics. The mean science score of 311 is slightly below the midpoint between basic and proficient.

10th- and 11th-Grade State Assessments

All Delaware 10th- and 11th-graders participate in the Delaware Student Testing Program (DSTP). In 1993, only three percent of Sussex Tech students met or exceeded the state writing standards. In 2002, 54 percent of Sussex Tech students met or exceeded the state writing standards. (The state mean is 49 percent.) Percentages of students meeting and exceeding the state standards have also continued to increase in mathematics, reading, science and social studies. (See Table 2.)

Table 2
Sussex Tech Percentages Meeting and Exceeding Standards
Delaware State Testing Data — 10th and 11th Grades

	1993	1998	2000	2002
Mathematics (10 th)	5%	29%	38%	47%
Reading (10 th)	8%	64%	74%	76%
Writing (10 th)	3%	37%	56%	54%
Science (11 th)	N/A	N/A	40%	63%
Social Studies (11 th)	N/A	N/A	25%	61%

¹ The *HSTW* Assessment consists of reading, mathematics and science tests that are referenced to the National Assessment of Educational Progress (NAEP). Test items in the *HSTW* Assessment are derived from the publicly released items in the NAEP item bank. The *HSTW* Assessment's four proficiency levels in reading, mathematics and science (below the Basic level, Basic, Proficient and Advanced) are defined in ways similar to NAEP's four proficiency levels.

School leaders and teachers at the school believe that continual benchmarking and data analysis are important and will continue to be a priority at Sussex Tech. “Outside variables may impact data from year to year. That is why it is important not to become discouraged if results go down one year,” said Falatek. “If you stay committed and continue to assess and adjust the curriculum, you should see success reflected in the longitudinal data.”

SAT Scores

SAT scores are another indicator of academic achievement. Since 1994, the percentage of Sussex Tech students taking the SAT has continued to climb, and by 2002, almost half of the students took the SAT. Mean scores have increased during the past 10 years: (See Table 3.)

Table 3
Mean SAT Scores at Sussex Technical High School

	1993-94	1995-96	1997-98	1999-00	2001-02
Verbal	380	464	462	464	471
Mathematics	410	437	450	452	477
Combined	790	901	912	916	948
Seniors Taking SAT	8%	17%	22%	35%	48%

Taking the “Right Stuff”

The focus on rigorous standards begins when a student enrolls at Sussex Tech, and it continues throughout high school. Strict graduation requirements are aligned with the school’s goal of increasing students’ higher-order thinking and problem-solving skills by relating academic content to real-life applications.

Results from the 2002 *HSTW* Assessment reflect dramatic changes in English, mathematics and science course-taking patterns at Sussex Tech. The percentage of career-oriented students taking college-preparatory English 12 increased from 20 percent in 1993 to 100 percent in 2002. Table 4 shows how the percentage of students taking challenging mathematics courses has increased, with the greatest one in Algebra II — an increase from 54 percent in 1998 to 80 percent in 2002. The percentage taking Geometry increased from two percent in 1990 to 88 percent in 2002. Not only did the percentages of students taking these courses increase, but their mean scores also increased. The percentage of seniors taking mathematics increased from 63 percent in 1996 to 70 percent in 2002, and their mean achievement scores far exceed the *HSTW* goal of 297 in mathematics.

Table 4
Mathematics Course-taking Patterns and Mean Mathematics Scores

	1998		2002	
	Percent	Score	Percent	Score
Algebra II	54%	314	80%	321
Geometry	74%	308	88%	319
Trig/Algebra III	11%	317	27%	324
Pre-Calculus/Calculus	21%	324	47%	332
Four years of mathematics	64%	303	67%	322
<i>HSTW</i> Mathematics Goal	297			

Source: 1998 and 2002 *HSTW* Assessments

Note: Sussex Tech's students (47 percent) who complete Pre-Calculus had a mean mathematics score that exceeded the proficient level. Those who finished Algebra III/Trigonometry (27 percent), Algebra II (80 percent) or Geometry (88 percent) had mean scores that approached the proficient level.

The school has also made progress in getting its students to take more challenging science courses. Table 5 shows that the greatest gains have been in getting students to take chemistry and physics. In 2002, approximately 60 percent of students took physics. Sussex Tech students enrolled in challenging science courses have mean achievement scores in science that far exceed the *HSTW* goal of 299 in science.

Table 5
Completing Types of Science Courses and Mean Science Scores

	1998		2002	
	Percent	Score	Percent	Score
College-prep Biology	92%	290	98%	311
Anatomy and Physiology	43%	287	58%	306
Chemistry	78%	289	92%	311
Physics	36%	299	60%	321
Science the Senior Year	61%	286	70%	318
Four or more Science Courses	53%	285	63%	318
<i>HSTW</i> Science Goal	299			

Source: 1998 and 2002 *HSTW* Assessments

Note: Sussex Tech's students (60 percent) who complete Physics had a mean science score that approaches the proficient level. Those who completed four science courses had a mean science score that is in the upper range of the basic level.

Other Successes

Sussex Tech has made significant progress in a number of other areas:

- The computer-to-student ratio is approximately one computer to every 1.2 students.
- The school has the lowest rate of serious disciplinary infractions of any high school in Delaware. During the 2001-2002 school year, only two percent of all ninth-graders were suspended, compared to 24 percent for the state; three percent of seniors were suspended, compared to 14 percent for the state.
- The school's dropout rate of 1.5 percent is significantly lower than the state rate of 6.2 percent.
- The school's graduation rate increased from 86 percent in 1994 to 93 percent in 2002. The graduation rate for special education students in 2002 is 89 percent, the highest rate in the state.
- The number of students earning double majors increased from three in 1993 to 29 in 2002-2003.
- Graduates are successfully enrolling in postsecondary education, including the University of Delaware, the U.S. Military Academy (West Point), the Parsons School of Design, Nashville Auto/Diesel College and numerous apprenticeship programs. The percentage of students planning to undertake post-secondary education (including four-year and technical schools) grew from almost 26 percent in 1990 to 84 percent in 2002.

In keeping with a pledge to become a state and national model for preparing career-oriented students, the school was recognized as:

- a National School of Excellence by the U.S. Department of Education;
- a "Superior Performing High School" by the State of Delaware for the school's performance in the state's testing program;
- a New American High School by the U.S. Department of Education for the collaborative efforts between the school and parents, community groups and colleges on preparing students for further learning and work;
- one of five schools of excellence for designing and implementing career pathways by *U.S. News and World Report*;
- one of the seven model schools in the nation by the Corporation for Work and Learning and School-To-Career Partnership;
- successfully integrating academic and technical skills by *Education Week*;
- one of 10 high schools in the United States to receive the National Business Week Award for instructional innovation;
- one of four high schools as having a "Library of the Future" by the Library of Congress.

Plans for the Future

Sussex Tech leaders and teachers are committed to the type of integrated, high-quality education that gives students a competitive advantage on the job site and in postsecondary education. To support this commitment, advisory council members play an active role in helping the school identify the necessary equipment for state-of-the-art instruction. Sussex Tech will continue to evaluate its curriculum and make whatever changes are necessary to prepare its students for success in postsecondary education and careers, including requiring four years of mathematics for all students.

Sussex Tech understands that the transition from middle school to high school is a difficult process for young students. The school will continue to focus on personal counseling in order to guide and strengthen students throughout their high school careers, both academically and psychologically. The school is also committed to ensuring the success of its students by continuing to provide extra help to those who need more support.

The changes that have taken place at Sussex Tech in recent years are not “cosmetic.” Putting together a high school that works requires a long-term commitment based on a clear vision of what the high school should be for its students and its community. Sussex Tech is living up to that commitment.

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