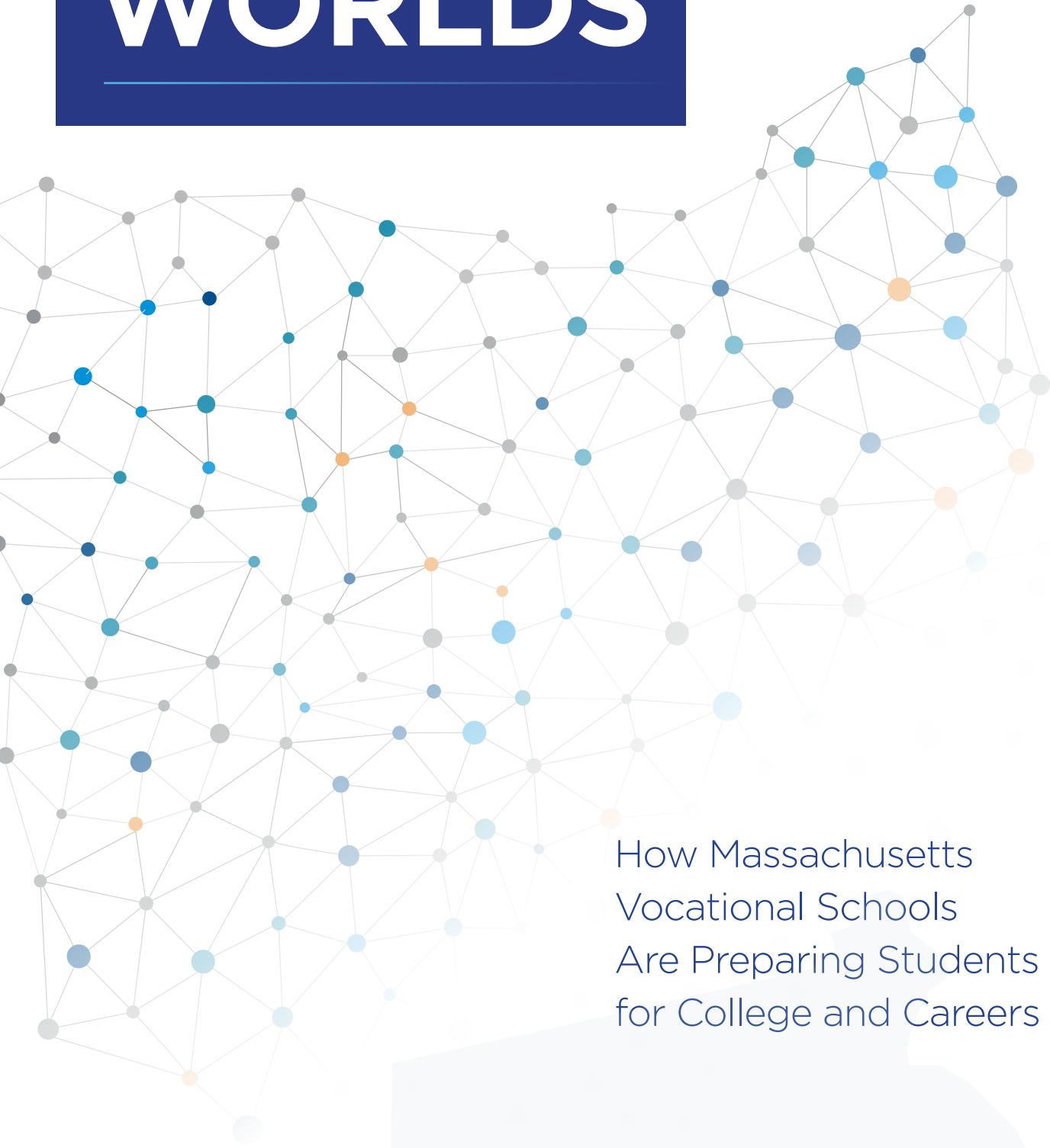
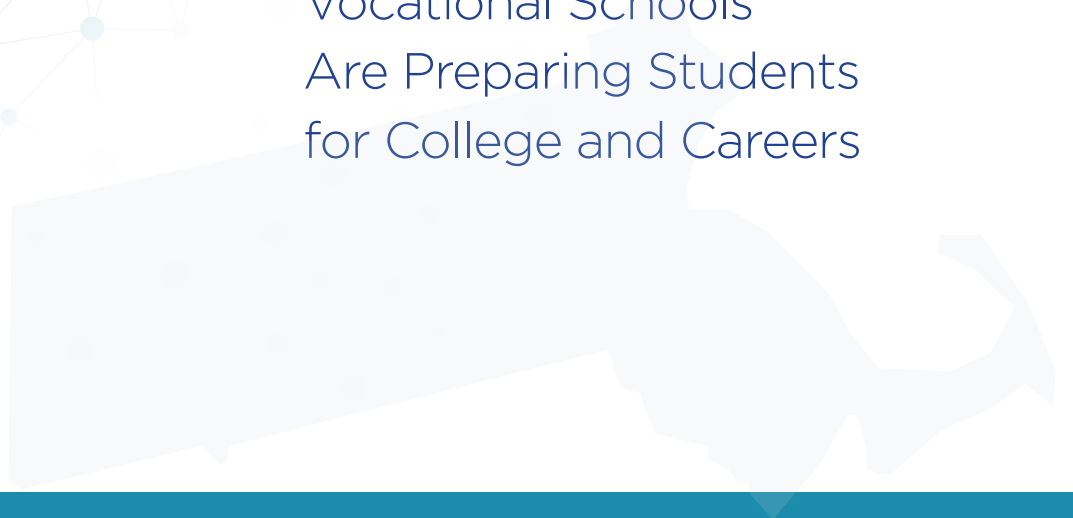


Best of Both **WORLDS**



How Massachusetts
Vocational Schools
Are Preparing Students
for College and Careers



> Published in June 2015.

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Introduction

On a chilly December morning, **Essex Technical High School** is a warm hive of activity. Students in the Information Technology program are setting up a new wireless network, while on another floor, 9th graders extract DNA from yeast cells. Out in the barns students are busy tending to the school's 14 horses, applying what they have learned about equine anatomy as they do routine checks. In other corners of the sprawling campus, their peers focus on math, English, history, and science assignments, mastering the more traditional academic content they will need to be college ready.

More than half of Essex Tech students will go on to pursue a postsecondary degree upon graduation; the rest will go straight into the workplace — including some apprenticeship programs that will lead to full-time employment — or the military. All will have a leg up on their peers from more traditional high schools, graduating with professional certifications, real-world experience and college credits already under their belts.

Essex Tech is one of a number of Massachusetts' vocational schools getting impressive results with a revamped college and career focus. The school as it operates now is the result of a recent merger of the high-performing **Essex Agricultural** and **North Shore Technical** high schools, which also absorbed the City of Peabody's technical school. Operating as an independent district, Essex Tech draws students from 13 surrounding towns and cities (the agricultural program serves 53 communities). Over the next four years, it will grow to serve 1,400 students on its new \$135 million campus, expanding Advanced Placement (AP) and early college opportunities while preparing students in career areas as diverse as masonry and natural resources management.

In the central part of the state **Blackstone Valley Regional Technical High School** (known as Valley Tech) offers an equally impressive array of offerings, with more than 200 students enrolled in AP courses each year and a total of 18 vocational shops that prepare students for lucrative careers, including work in the region's growing health, engineering, and precision-manufacturing industries.

CAREER AND TECHNICAL EDUCATION IN MASSACHUSETTS: A MULTIPRONGED SYSTEM

Regional vocational schools: Essex and Valley Tech are two of 29 stand-alone regional vocational schools in Massachusetts. Each school operates as an independent district, drawing students and funds from neighboring communities and answering to its own school committee and local advisory board.

District vocational schools: Massachusetts has nine additional stand-alone vocational schools that operate under the auspices of individual districts. These schools answer to their district school committee and an independent advisory board.

Embedded career and technical programs: Many districts also operate career and technical education programs within other public schools. These programs include elective tracks embedded within comprehensive schools and themed academies as well as programs designed for students with significant disabilities.

These two schools are what Massachusetts Association of Vocational Administrators (MAVA) Executive Director David Ferreira calls “the Cadillac model of the CTE [career and technical education] world.” Among vocational educators, these schools have become the leading examples of what it takes to prepare students for the demands of college and 21st century careers.

The Transformation of Vocational Education

Massachusetts’ technical schools were not always at the head of the pack. Less than 15 years ago, Valley Tech and its counterparts were referred to as “trade schools” — places where struggling students could escape academic rigor and learn a valuable hands-on skill. There, students could delve into one of a handful of traditional trades, such as auto repair, and graduate prepared only for work in those specific fields.

Today, the landscape has changed significantly. Essex and Valley Tech rival the top comprehensive high schools in the state with graduation rates approaching 100 percent, Massachusetts Comprehensive Assessment System (MCAS) proficiency rates well above the state average, and a significant majority of graduates enrolling in college.¹ (See Table 1.) Virtually every graduate of Essex and Valley Tech completes the state’s recommended MassCore curriculum, and since 2008, the percentage matriculating directly to college has climbed significantly. A growing portion of graduates are choosing four-year schools; for example, 14 percent of Valley Tech’s class of 2012 enrolled in a two-year college, while 52 percent enrolled in a four-year school. (See Table 2.) In 2008, 22 percent of graduates enrolled in a two-year college, while 39 percent enrolled in a four-year school.

Fifteen years ago, many thought combining a full vocational curriculum with college-ready academic standards would be impossible, but these schools — and their students — have risen to the challenge. “It’s not a mirage,” says Commissioner of Education Mitchell Chester. “There’s certainly variation among the schools, but the strong ones are outstanding. They’re running not just a strong academic program but a vocational program too. That’s for real.”

STUDENT PROFILE

Dillon Arnold originally planned to study drafting at Valley Tech. After exploring several shops in 9th grade, he got hooked by the Electronics and Engineering Technology program. Now a senior, Dillon has completed industry-recognized certificates in electronics and earned bronze and gold medals in the national SkillsUSA robotics competition. Through an electronics co-op position at Milgrade Hospital, he has also seen how his designs affect patients’ lives. Dillon has the option of going directly into an entry-level electronics position upon graduation but is choosing to build on the engineering and design principles he has learned to pursue a degree in mechanical engineering. “Ultimately, I want to work in the military side of the robotics field,” he says. “Bomb disposal. . . . If a robot can go out and dispose of a bomb without killing 50 guys, that’s great. You can replace a robot rather than the guys.”

¹ MCAS is the state’s assessment system in English language arts, math, and science and technology/engineering. The exams are considered to be among the most rigorous in the country and are still being administered in districts as the state considers and tests out the Partnership for Assessment of Readiness for College and Careers (PARCC) assessment system. The Board of Elementary and Secondary Education is scheduled to vote on transitioning to PARCC in 2015.


TABLE 1: Student Outcomes

	Enrollment				MCAS (Grade 10)		
	2014-2015				% proficient/advanced 2014		
	Total#	High Needs (2013-14)* %	Low Income (2013-14)%	SWD %	ELA	Math	Science
Blackstone Valley Regional	1,185	22.6	13.0	11.2	98	93	90
Essex Agricultural (2013-2014)*	472	26.5	19.5	8.7	98	88	93
North Shore Regional (2013-2014)*	463	54.9	37.4	30.0	96	70	71
Shawsheen	1,368	37.5	17.7	25.1	97	84	80
State average	288,934	48.8	35.8	17.3	90	79	71

*The Massachusetts Department of Education designates a student as high need if he or she is designated as either low income (prior to School Year 2015), economically disadvantaged (starting in School Year 2015), or ELL, or former ELL, or a student with disabilities."

	High School Outcomes			Postsecondary Outcomes	
	2014			Class of 2012	
	MassCore Completion %	Annual Dropout %	4-year Graduation %	College Enrollment %	College Remediation (MA public colleges) %
Blackstone Valley Regional	96.1	0.2	98.2	66.3	24.2
Essex Agricultural (2013-2014)*	100.0	0.2	97.4	75.5	31.5
North Shore Regional (2013-2014)*	100.0	0.2	97.5	43.5	33.3
Shawsheen	68.5	0.4	97.3	68.0	37.9
State average	72.4	2	86.1	75.3	36.4

*Predecessors to newly merged Essex Tech

Source: Massachusetts Department of Elementary and Secondary Education, 2014

TABLE 2: Postsecondary Outcomes Snapshot

	% of grads enrolled in 2-year college	% of grads enrolled in 4-year college	Total college %	College remediation (MA public colleges) %	College persistence (returned for a second year) %
Blackstone Valley Regional (2012)	14	52	66	24	80
Essex Agricultural (2011) *	33	43	75	31	86
North Shore Regional (2011)*	24	19	44	33	70
Shawsheen Valley (2012)	23	45	68	38	82
State Average (all high schools)	21	54	75	36	81

*Predecessors to newly merged Essex Tech

Source: Massachusetts Department of Elementary and Secondary Education, 2014

MASSCORE: A COLLEGE- AND CAREER-READY CURRICULUM FOR ALL

MassCore, the state's recommended graduation requirements for all students, includes a full complement of courses and learning opportunities that students need to graduate college and career ready. The course of study meets or exceeds admissions requirements established by the Massachusetts Board of Higher Education and includes four years of English; four years of math; three years of a lab-based science; three years of history; two years of the same foreign language; one year of an arts program; and five additional "core" courses such as business education, health and/or technology. MassCore also includes additional learning opportunities including Advanced Placement classes, dual enrollment, a senior project, online courses for high school or college credit, and service or work-based learning opportunities.

Individual districts — and regional vocational schools, which operate as districts — may choose whether to align their own graduation requirements with MassCore. Vocational schools are permitted to waive the arts and foreign language requirements but are otherwise held to the same academic standard as other schools.

Most of the state's vocational schools, including those featured here, have made MassCore their default curriculum — aligning their own graduation requirements to the recommended courses and creating a master schedule that ensures that every student has an opportunity to complete a rigorous MassCore curriculum in addition to a full program of vocational study.

A Dual Impetus for Change

Once upon a time, Massachusetts vocational students could rely on steady work after graduation — jobs in fields like carpentry and manufacturing that did not necessarily require further education — and their schools had a solid reputation for producing capable graduates, ready for the realities of work. However, that did not last as the workforce started to change. Some jobs disappeared or went overseas, while others began to require more advanced skills. MAVA's David Ferreira explains that employers today are "looking for much more technically and academically trained graduates. They want critical thinkers who can write, communicate, and collaborate. They need to read technical manuals written at 13th or 14th grade level." Technology has also driven a lot of the changes. "Manufacturing is no longer manual carving," Ferreira says. "Now it's driven by people who can program a machine."

By the turn of the century, vocational schools and other schools across the state were hearing a common message from local industry: Too few high school graduates demonstrated the skills required for a knowledge-driven economy. It was time to ramp up standards to keep pace with the changing needs of the workforce.²

² "Educating a 21st Century Workforce: A Call for Action in High School Reform." Massachusetts Business Alliance for Education, 2008.



Another big push came almost simultaneously. With the Education Reform Act of 1993, Massachusetts became a trailblazer and was one of the very first states to roll out an ambitious new set of academic standards and accountability measures for all schools, in response to both local workforce needs and a national call for college- and career-ready standards. The Department of Elementary and Secondary Education (ESE) introduced more rigorous curriculum frameworks across subject areas, and beginning in 2003, all public school students had to pass MCAS assessments in English language arts and math to earn a diploma.³

“It was a contentious time,” says Ferreira. “Fear existed that we would no longer be able to achieve our mission of preparing students for the world of work if the focus was on MCAS preparation.”

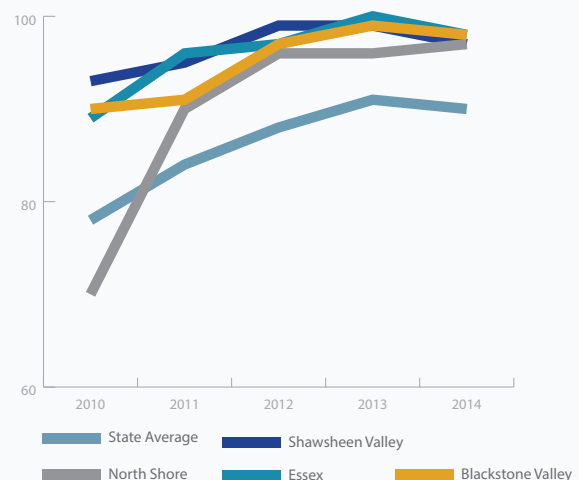
The battle was partly philosophical — many believed that vocational students were different from their peers and the mission of vocational schools distinct — but there was also a pragmatic question about time. Prior to MCAS, 75 percent of Valley Tech’s schedule was dedicated to vocation-related activities; students spent one week in shop, and during the alternate week, time was split between core academic subjects and courses introducing shop-related theory. Trade leaders who oversaw approved programs and shop teachers feared that additional time spent on academics would take away from valuable job-related training. Citing these concerns, a group of school leaders banded together under MAVA to petition the state for a waiver from the MCAS requirement. “It became clear fairly quickly that the state would not allow any exceptions,” says Ferreira.

Valley Tech was not among the schools that originally lobbied for an MCAS waiver, confident early on that its students and faculty were more than up to the challenge. Principal Anthony Steele says, “We stayed the course and said, ‘No, we can do both.’ ... That was a major fork in the road.” From that point forward, Valley Tech set about proving that students could do both: achieve high academic standards and obtain career and technical skills. “Thank God we were right,” says Superintendent Michael Fitzpatrick. “It could have been a disaster.”

³ The graduation bar was later raised from “passing” to “proficiency,” and a high-stakes science and tech/engineering exam was phased in a few years later.

MCAS Proficiency Rates 2010-2014

CHART 1: ELA MCAS SCORES
(% OF STUDENTS PROFICIENT/ADVANCED)



Source: Massachusetts Department of Elementary and Secondary Education, 2014

Valley Tech's leap of faith paid off. MCAS scores and graduation rates rose, dropout rates fell even further, and students continued to thrive in their shop classes and work placements. (See Charts 1-4.) Other vocational schools experienced a similar phenomenon. Essex Tech Principal Brad Morgan says, "The resistance faded when they saw, wow, this really works."

Staff now largely agree on the mission of a vocational education: to provide students with as many options upon graduation as possible. "Who are we to tell them they can't [go to college]?" says Kyle Brenner, director of career and technical programs at Worcester Tech, a stand-alone school serving the city of Worcester. "The way I see it is, we're giving you a key to each one of those doors."

Vocational educators now look at a continuum of opportunities within each trade — for example, electrician to electrical engineer — understanding that career pathways can be fluid. Some students may opt to enroll in college right away, while others may move directly into employment. (A student graduating from Essex Tech's Electrical program, for example, will leave with 150 hours toward a journeyman's license — the equivalent of 1.5 years of work.) Some students do both: moving into the workplace while pursuing continuing education part time. In the best scenarios, employers like Waters Corporation in Milford hire newly minted graduates — students they have helped groom in cooperative job placements — and commit upfront to cover the cost of a college degree.

MCAS Proficiency Rates 2010-2014

CHART 2: MCAS MATH SCORES
(% OF STUDENTS PROFICIENT/ADVANCED)

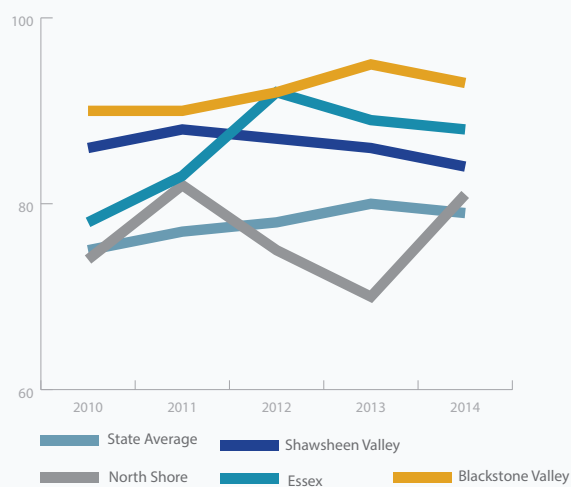
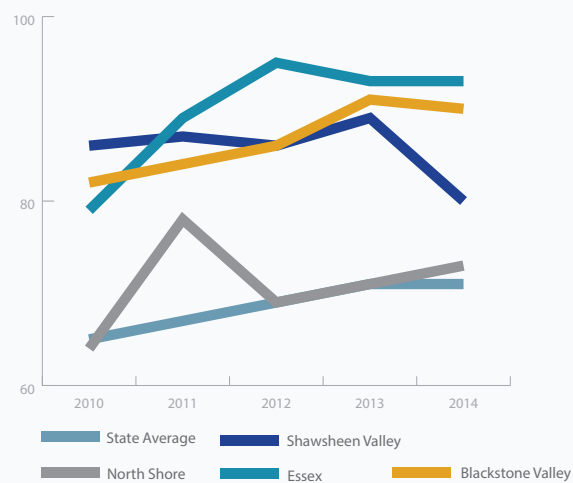


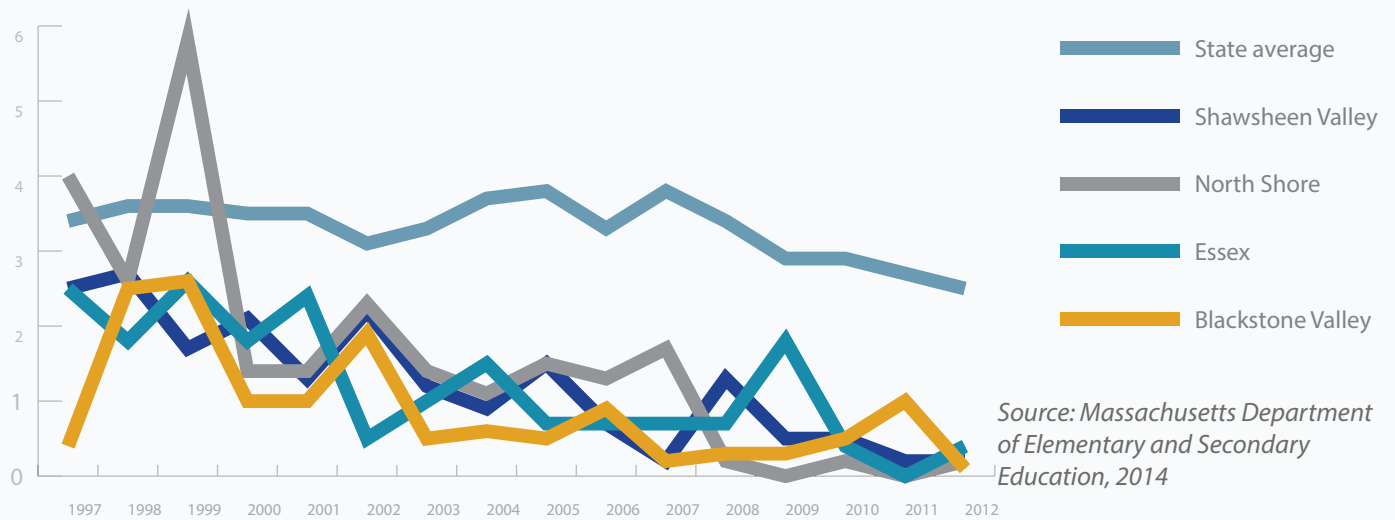
CHART 3: MCAS SCIENCE SCORES
(% OF STUDENTS PROFICIENT/ADVANCED)



Source: Massachusetts Department of Elementary and Secondary Education, 2014



CHART 4: DROPOUT RATES 1997-2012
(% OF STUDENTS PROFICIENT/ADVANCED)



A Tale of 38 Schools (and 45 Programs)

There is no single story of transformation among Massachusetts' diverse vocational schools. Ultimately, the regional schools are independent operators, answering to their own school committees, advised by industry leaders from their region and responding to different expectations among participant communities. Two centralized bodies — the ESE and MAVA — provide some support across the schools. Most significant are the state's curriculum frameworks for each of the technical trades, which have been revised multiple times since 2000 to reflect increasing college and career standards. Written by ESE-organized committees of teachers and industry advisers, the frameworks delineate the content and skills each trade area must address, providing a jumping off point for school-based curriculum planning.

MAVA provides additional support through regular convenings of vocational school leaders and professional development opportunities for teachers. MAVA membership is voluntary; with more than 50 schools represented and limited turnover in school leadership, it is a tight-knit community, and best practices are shared freely.

Guided to a degree by these statewide entities, the schools each tackled the challenge of rising academic and career standards with distinct approaches. Valley Tech opted to keep its alternating week schedule (see Figure 1 on page 15) but with some significant alterations: It added 13 days to the school year, eliminated study periods and pushed “related theory” classes (in which students learn the underpinnings of their trade) into the vocational week to create more room for academics. Essex Agricultural moved to a day on/day off schedule to keep students more grounded in academic content, while North Shore Tech stuck with its three days on/three days off rotation, a schedule that carried over to the merged school. All three schools ramped up their academic curricula with a more rigorous course sequence, including more honors-level and AP options and longer academic blocks where needed.

Over time, the schools have kept up with the evolving state reform agenda, which has become more explicit about what students need to be college and career ready. The state's rigorous MassCore course recommendations, introduced in 2007, prompted further adjustments, particularly in math and science. Valley Tech rethought its math sequence completely, offering an intensive two-year algebra option to prepare students with weaker skills for Algebra II and eliminating science electives, like forensics, in favor of a third lab science. Students have met the ever-rising bar, with 96 percent completing MassCore prior to graduation, close to 100 percent achieving proficiency on the MCAS exam in English language arts, and math and science proficiency rates that are not far behind.

DOING THE “IMPOSSIBLE”

Today's vocational students are accomplishing what one Valley Tech senior calls a “double education” in the same amount of time. How is it possible?

Academic teachers plan carefully. They get approximately half of the instructional time that a typical high school teacher gets. Double blocks in core subjects help, but academic teachers must make every minute count, especially in content-heavy Advanced Placement (AP) courses. Instructional delivery does not necessarily look different than that of another school; with a mix of career areas represented in every class, tailoring academic content to each student's area of concentration is impossible. The difference is in the time invested in planning; each academic department carefully maps its courses to the state standards and its own goals for graduates. Depending on the school schedule, departments may meet once or more per week, in addition to significant planning time over the summers.

Kim Haven, who has taught math at Valley Tech since 1998, admits there was panic when the Massachusetts Comprehensive Assessment System (MCAS) first became a requirement. “We asked, how will we ever do this? How will the students be able to do this? But then ... we worked hard to create curriculum that would make that achievable in the time that we have, and they really rose to our expectations.” Some anxiety has returned with the new assessments aligned to the Massachusetts Curriculum Frameworks, but Ms. Haven is confident that she and her colleagues will find a way to meet those expectations too.

For career and technical education (CTE) teachers, it's all about integration. They still teach many of the same technical skills as they did in the past, but CTE teachers have had to keep up with new technologies and evolving industry practices, while building in more rigorous trade-related content. The state's revised vocational frameworks, aligned with the Common Core standards, include detailed academic standards that every vocational teacher must cover. These embedded academic standards are not a subset of the core academic curriculum; rather, they derive from the vocational program itself, representing places where students need additional academic background to fully master a technical skill. Carpentry students, for example, must understand the principles of geometry and trigonometry to construct a roof, while environmental technology students must be proficient in measurement and graphing skills to conduct water sample analyses.



DOING THE “IMPOSSIBLE” continued

Some trades include fairly extensive coursework alongside the hands-on practice, such as anatomy mini courses embedded within veterinary and health assisting programs. That content is taught in addition to the biology classes that all students take. At the more rigorous end of the spectrum, Tri-County Regional Technical High School has built an AP Engineering course into its Engineering Technology shop. Vocational Coordinator Jean George explains that the course “gets them to think academically in their vocational program ... so they feel able to do this kind of work in college.”

For students it’s mostly a matter of managing time. They get a lot of homework, especially in academic classes, and participate in extracurricular activities and sports on top of maintaining what is effectively a double course load. Keeping up requires getting ahead of deadlines and, often, seeking after-school help. Resource classes, study support courses, and classroom-based aides provide additional support for those who need it.

Essex Tech senior Sydney Lovelace notes that the alternating schedule provides some breathing room: “We’re doing everything much faster than everyone else does ... so it’s a lot of work, but during the shop days I have a little bit more time to myself to get the academic work done for the next three-day cycle.” Classmate Brooke Miles adds, “It’s a lot to balance ... but in the end it’s worth it because you develop such a work ethic.”

The Secret Formula of Success (Hint: There Is No Secret)

“We’ve had a lot of visitors come and try to capture lightning in a bottle, to figure out what’s going on,” says Valley Tech Principal Steele, but he and Superintendent Fitzpatrick insist that no single ingredient is responsible for their results. “It’s everything we do,” explains Fitzpatrick.

Other school leaders share a similar perspective, pointing to a range of investments and decisions that have contributed to their students’ success. Despite the variation in their approaches, a few common themes emerge across the schools:

1. Real-world learning is a powerful motivator.

Student engagement is high across the vocational schools — extraordinarily low dropout rates are just one sign of proof. For some students, including many who struggled in traditional schools, hands-on learning comes more naturally. Others are motivated by the tangible rewards: industry-recognized certifications (see Figure 2 on page 16), transferable hours and credits, and the possibility of paid cooperative placements. Students are further encouraged when they get to see how the skills and knowledge they have gained can be applied in off-site internships or community improvement projects.

Electrical teacher Christos Xerras has seen his students’ skills come together as they, along with Essex Tech carpentry and masonry students, have helped construct a new solar-powered

building on campus. “It’s done like a real job,” he says. “Permits are filed, inspections take place and the students see how that process works. Sometimes there’s no substitute for doing something out in the real world.”

That real-world experience gets students invested, and according to **Shawsheen Tech Principal Robert Kanellas**, “once you engage a kid vocationally, she becomes engaged academically.” Students who may have been average or below average in middle school are suddenly willing to double down on challenging academic assignments to further their goals. This willingness translates into higher performance across the board. It also fosters strong work habits and other valuable college and career skills like persistence, teamwork, and problem solving.

Junior Hannah Marchant got Cs in middle school and “wasn’t really motivated at all.” At Essex Tech her “eyes opened to all of the opportunities,” she says. “I’m more of a motivated person since I’ve been here... The Health Assisting program gives you a lot of opportunities and it just makes you think about how it’s worth it to work hard and be persistent.”

2. Caring relationships with adults go a long way.

When asked what helps them succeed in challenging academic and vocational courses, the first thing students mention is the warm school community and caring staff — an unexpected theme among schools that enroll more than 1,000 students. When students tell stories of how they overcame weak literacy skills, a learning disability, or just a general lack of motivation, they point to the support they have had from teachers. “I don’t even think of them as teachers,” says Worcester Tech senior Hector Cedre. “I think of them as family.”

“Teachers are willing to stay after if you need help, almost any day,” says Essex Tech senior Michael Tilton, who was hampered by dyslexia prior to high school. This extra instructional time — often provided by teachers voluntarily — is essential for some students, especially those who come in far behind.

Guidance counselors also have a role to play, going beyond the traditional job description to help students develop and pursue personalized career plans. At Valley Tech, counselors lead the career development courses that students take every semester. They help 9th graders evaluate their interests and skills and select the shop they will follow for the next three and a half years. The course also helps students set goals, manage time, map out future plans, research career and college opportunities, and prepare for interviews and applications.

Vocational teachers become the home base for many students. Each CTE area typically enrolls 15–20 students per cohort and has three or four teachers, all with industry experience, who work with those students over their high school career. This structure fosters close relationships, with teachers often becoming advisers and mentors as well. Shop teachers become a point of contact for other staff, heading off behavioral issues before they escalate and alerting colleagues when a student may be in need of support.



Masonry student Ricky Valenzuela credits his teachers with his significant academic growth and positive life decisions: “Even when they aren’t working, you can see how they just want to help make you a better person.”

3. Continuous improvement is the name of the game.

Vocational educators expect a lot from themselves. Leaders hold high expectations too, giving departments room to experiment, make mistakes, and design the strongest possible program for students. This ethic of continuous improvement is at least partly driven by necessity: Vocational schools must make the case to local districts for funding each year, answer to their industry advisers, and compete with area schools to attract students.

Staff are constantly looking at various forms of data to guide their progress, including end-of-year MCAS results, diagnostic and formative assessments aligned with MCAS and Accuplacer tests, attendance trends, cooperative job placement figures, and college enrollment and remediation rates. School leaders speak regularly with local employers who have hired alumni, as well as with graduates, gathering anecdotal feedback that helps them gauge how well they are preparing students for the demands of college and the workplace.

The superintendent and principal of Valley Tech, who like many of their counterparts around the state have been in their school leadership roles since the early 1990s, ascribe to the “Total Quality Management” approach to continuous improvement, while Tri-Country Tech has partnered with the Association for Supervision and Curriculum Development (ASCD) to train all staff in the Understanding by Design⁴ approach to curriculum development. Essex Tech also invests heavily in planning time during the school day and summers, which is when staff identify outcomes they want every graduate to achieve and determine when and how those skills will be taught and assessed.

Budgetary challenges have also provided a catalyst for improvement at Worcester Tech. Teachers frequently apply for competitive grants to supplement limited budgets, and in the process, they have designed innovative, cross-departmental projects, like the restoration of an historical bridge for a city park and a green building project with Heifer International. The collaboration and interdisciplinary thinking provide powerful learning experiences for adults as well as students.

STUDENT PROFILE

Sydney Lovelace was not an average student in middle school — the social scene interested her far more than her grades. Wanting a change of scenery, she applied to Essex Tech, unconvinced she would stay. “Something opened my eyes when I saw the internships that we would be able to do,” she says. “That’s not an experience you would get at a normal high school.” Sydney worked hard during her two-week exploratory in the Health Assisting program, vying for a coveted spot. She has not stopped working since. Now a senior, Sydney balances a heavy load of Advanced Placement courses, a nursing internship and extracurriculars. She has decided she wants to become a doctor, and her vocational experience has given her an edge in college applications. “I have so many certifications and internships,” she says. “It helps them see, ok, she’s actually committed. She knows what she’s getting into. . . . It’s a really big deal.”

⁴ See <http://www.ascd.org/research-a-topic/understanding-by-design-resources.aspx>.

THE SELECTION QUESTION

One criticism leveled at the Massachusetts vocational schools is that they have actually become too selective. The regional vocational schools were underenrolled for many years, making their admissions criteria irrelevant. Now, as demand for seats grows, the schools are pulling from a larger, more competitive pool of students.

Today the regional schools have an admissions process that allocates points for middle school grades, attendance, effort/discipline, and guidance counselor recommendation. The process is blind in terms of demographic factors and academic track; it is also compensatory — strong attendance and behavior could make up for middling grades or vice versa.

The schools continue to attract students who struggled in middle school, and many vocational schools serve a significantly larger special needs population than their sending communities. Shawsheen Tech and Tri-County Tech, for example, serve 25 percent and 27 percent special needs populations respectively, rates far above the state average and the rates of sending communities.

The admissions question boils down to choice: Regional vocational schools enroll students who elect to be there, whereas district schools must serve everyone. This difference is a source of some friction. Local districts want the vocational schools to take their most disengaged youth, while the vocational superintendents argue that, with a compressed curriculum, they must ensure that they have students who are on board with their mission. The state has been exploring this issue to ensure that all students have equitable options.

Clear Goals, Smart Customers

When Zenia Rodriguez first heard about the Dental Assisting program at Shawsheen Tech, she thought “it would be a great way to get ahead in life.” Some vocational students, like Zenia, enroll with specific college and career goals in mind. Others are excited by the prospect of learning outdoors, working with animals, helping patients, or mastering a particular skill. Still other students are fed up with sitting in traditional classrooms and want an experience that suits their preferred style of learning.

Whatever the initial motivation, vocational students quickly gain a much more precise sense of where they are headed next. This quality, perhaps, is what best distinguishes them from their peers in more traditional schools: They leave high school ready to make informed decisions about their next steps.

In addition to the career mentoring they get from their CTE teachers, students have opportunities to work alongside adults representing a range of career options through off-site projects, internships, and cooperative placements. A student graduating from Worcester Tech’s veterinary program has seen veterinarians, veterinary assistants, and veterinary technicians at



work; understands their roles; and knows the steps involved in pursuing any one of those careers. By the time they graduate, vocational students have long since learned that environmental protection is vastly different than marine biology, that computer programming requires a different skillset than networking, and that masonry can be back-breaking work.

“A student is going to change careers eight times in their adult life,” says Superintendent Charles Lyons. “Ours have a foundation to make lateral moves [to other fields] later on. We don’t sentence you to becoming a carpenter ... but there are a lot of happy carpenters out there.”

Edward Taylor applied to Valley Tech thinking he wanted to pursue information technology. Through the exploratory process, he discovered a better fit in multimedia communications. Now a junior, he is not sure if he will pursue communications in college, but, he says, “I am still going to have four years of experience. I’m going to have skills that other people don’t have. ... It was good to go through this and find out that maybe I might not want to do this, rather than go to college and decide afterwards this was a big waste of time.”

Teachers, meanwhile, encourage students to keep doors open, especially to college. Essex Tech’s David Lucier tells his automotive students: “So you’re going to be an Automotive Service Excellence (ASE) certified technician in automotive. Well, four or five years from now, what if there’s a service manager’s position and you want to apply? If you don’t have an associate degree, you’re not in the running.”

Enthusiasm Is Spreading

Large waitlists — often two or three applicants per available seat — are a clear signal of rising public opinion about the value of a vocational education in Massachusetts. Students are excited by the chance to learn something tangible, and parents see opportunities for their children to access rewarding careers via a more efficient path.

As interest and enthusiasm spreads, state leaders are taking steps to reserve seats for the students who are most serious about pursuing a specific career path. The Board of Elementary and Secondary Education in February 2015 voted to limit the number of nonresident students who are able to enroll in exploratory programs when an approved program is available in their home district. The Board also approved new regulations to ensure that admissions policies prioritize local students who meet minimum admissions requirements.⁵

Newly elected Governor Charlie Baker has also identified “connecting school to work” as one of his administration’s top priorities, noting that relevance to careers boosts student engagement, leading to more graduates with the skills employers need today.⁶

⁵ See The Massachusetts Board of Elementary and Secondary Education, Amendments to Vocational-Technical Education Regulations, 603 CMR 4.00, February 21, 2015: <http://www.doe.mass.edu/boe/docs/2015-02/item5.html>.

⁶ Baker-Polito Transition Committee Report, February 4, 2015, <https://files.ctctcdn.com/c2bc7ccb401/4bd44985-ed29-4fd1-bfda-fd0ad85696db.pdf>.

“The state’s most successful vocational programs have shown us that there is a hunger for schools that can deliver strong practical and academic programs in personalized settings,” says Commissioner Chester. “The existing programs meet some of that need, [but it’s clear that] many more students remain to be served.”

Valley Tech Principal Anthony Steele agrees, calling the variety of opportunities the schools offer “an incredible draw.”

“They say, ‘You mean, I can learn a trade, but instead of just the trade, the whole pathway is opened to me?’” he says. “Suddenly, you’re not stemming off any choices. In fact, you’re creating opportunity, and you become an incredibly attractive place.”

The schools are popular among employers too. “They’re delighted to have such a skilled workforce,” says Steele, who regularly hears positive feedback from the school’s industry advisers, many of whom are alumni of the school and have hired recent graduates. They are eager to get vocational students into their companies through cooperative positions and school-industry partnerships. “We’re growing at a rapid rate,” explains Waters Corporation Model Shop Manager Steve Boulay. “It’s very difficult to find qualified individuals out in the standard workforce, so we decided to reinvest ourselves in the co-op program with [Valley Tech].”⁷

As these success stories spread, schools like Valley Tech and Essex Tech are getting more frequent visits from educators and political leaders who hope their models can offer lessons to vocational schools that are still floundering and, perhaps, to other types of schools as well. Even as they share the story of what brought them to this point, the Essex and Valley Tech staff are focused on what is next.

As Principal Steele puts it: “If you’re not already thinking of the next thing, you’re behind.”

STUDENT PROFILE

Prabhjot Kaur, known as PJ among her friends, had a tough time in middle school. A shy student, her grades began to dip in 6th grade. Soon, she was hiding report cards from her parents. That all changed when she got to Essex Tech, where a warm environment and an inspirational shop teacher brought her out of her shell. PJ is now an A student and one of a few girls in the Information Technology program. Last summer, she helped build the school schedule as an intern. Currently a junior, she is interested in getting a dual degree in information technology and business administration. Her biggest challenge is time. She is putting in extra hours to complete information technology certifications — she wants to earn at least two. “On top of that, I have academic work and the SATs to study for,” she says. It is a tricky balance and often stressful, but she is figuring out how to manage her time, a skill she will need in college, and she is excited to see the work paying off.

⁷ *Stories of Success*. Blackstone Valley Vocational Regional School District Fiscal Year 2014 Annual Report.



FIGURE 1: *A Day in the Life at Valley Tech*

Valley Tech’s schedule is split into alternating weeks of vocational technical and academic classes. During an A-cycle week, grades 9 and 11 attend academic classes while grades 10 and 12 attend their vocational technical programs. Academic days rotate between a “gold” and “purple” schedule, allowing for extended blocks in priority courses.

Week A		
	Purple Day	Gold Day
Period 1 7:55–8:36	AP U.S. History	AP English Literature & Composition
Period 2 8:39–9:20		
Period 3 9:23–10:04	Honors Chemistry	Current Events
Period 4 10:07–10:48		AP Calculus AB
Period 5 10:51–12:00	Current Events	Career Enrichment
Period 6 12:03–12:44	AP Calculus AB	
Period 7 12:47–1:27	AP English Literature & Composition	AP U.S. History
Period 8 1:30–2:10	Career Enrichment	Honors Chemistry
Week B		
Period 1–8 7:55–2:10	Shop (full day): Electronics & Engineering Technology Relative Theory Occupational Health & PE 12	

FIGURE 2: *Vocational Programs & Certifications*

Valley Tech offers 18 vocational programs through which students have opportunities to gain valuable work experience and earn industry-recognized credentials. Each program is overseen by a group of local industry advisers, who review the curricula and capital budget twice annually to ensure that the skills students are learning and equipment they use match current industry standards.

Automotive Collision Repair and Refinishing

- Respirator Safety
- Automotive Service Excellence (ASE) collision repair technician

Automotive Technology

- National Automotive Student Skills Standards Assessment (NA3SA)
- Automotive Service Excellence (ASE) automotive technician

Business Technology

- Microsoft Office Specialist certifications in Access, Excel, PowerPoint and Word

Construction Technology

- Genie Lift certification
- Up to one year of trade experience toward a state construction supervisor's license

Cosmetology

- OPI nail certification
- Beauty Pros International hair extension certification
- Commonwealth of Massachusetts Licensed Registered Operator

Culinary Arts

- Massachusetts allergen awareness
- ServSafe sanitation
- ServSafe alcohol service

Dental Assisting

- National Board certifications in infection control and radiation health/safety
- Cardiopulmonary resuscitation (CPR)
- First aid

Drafting and Engineering Technology Electrical

- Credit toward a state journeyman's license

Electronics and Engineering Technology

- Associate Electronic Technician certificate

Engineering Technology

- Certified SolidWorks Associate certificate
- Autodesk Inventor Certified User certificate
- ROBOTC certification

Health Services

- Cardiopulmonary resuscitation (CPR)
- Automatic defibrillator
- First aid
- Paid feeder
- Alzheimer's and dementia sensitivity training
- Certified Nursing Assistant/Home Health Aide (CNA)
- Introduction to electrocardiograms (EKGs)

Heating, Ventilation, Air Conditioning and Refrigeration (HVAC)

- Certified trade hours for state HVAC technician and pipefitting licenses
- Environmental Protection Agency Core 1, Core 2 and Universal certifications

Information Technology

- CompTIA A+
- CompTIA Network+
- Cisco CCENT
- Cisco CCNA

Manufacturing Technology

- Manufacturing Advancement Center Workforce Innovation Collaborative (MACWIC)
- American Welding Society

Multimedia Communications

- Adobe Associate
- Adobe Master Suite

Painting and Design Technology Plumbing

- Massachusetts Plumbing Tier certification
- Hours toward apprenticeship

In addition to the certifications listed above, all programs also provide workplace safety training (the Occupational Health and Safety Administration 10-hour card), and most have articulation agreements with one or more local colleges through which students receive advanced standing or college credit for technical training completed in high school.



A Powerful Employer Partnership

National Grid is one of many employers that look at Massachusetts' vocational high schools as a crucial part of their workforce strategy. Recently, the company launched a science, technology, engineering, and mathematics (STEM) sponsorship program at Worcester Tech to replenish the large segment of its workforce that is on the cusp of retirement. The generous program provides qualified students paid summer internships, mentorship through college, and a guarantee of a six-figure salary upon graduation from a college engineering program. Brenden Homsad and Styven Colón made the cut.

Brenden, the son of Laotian immigrants, has always been a strong student, while Styven entered high school way behind after spending elementary and middle school in special education. Both are getting an incredible training opportunity through the program. Now juniors, they spent last summer at a National Grid training center learning electrical line work and will spend next summer in engineering internships. Both intend to apply to four-year electrical engineering programs next year.

Getting to this point was a major feat for Styven especially, who spent many after-school hours climbing his way into regular education classes and needed an intensive summer prep course to prepare for Advanced Placement calculus this year. He is grateful to the teachers who provided extra help and is proud of what he has accomplished so far. Brenden's mom likes to brag about her son, the future engineer. "It's a pretty huge opportunity," says Brenden. "Now our career is set."

STUDENT PROFILE

Hector Cedre, a senior at Worcester Tech, entered 9th grade unable to read fluently and with a lot of obstacles at home. "Coming here was a big life change," he says. "I was raised in a household with a lot of drugs and gang members and stuff. My dad wanted something different for me." Hector was in special education initially and, with help from several teachers, put in many extra hours to pass the Massachusetts Comprehensive Assessment System (MCAS) English language arts test on his first try. Now a senior, Hector tutors at a local elementary school and has become a fan of horror novels and medical textbooks. He works in the school's on-site veterinary clinic, where he makes appointments, prepares vaccines, and supports the doctor and interns from Tufts Veterinary School as they provide a range of health services and surgical care to local pets. Hector's father, who dreamed of becoming a veterinarian himself, "is amazed with what I know," says Hector. He frequently asks his son to diagnose symptoms in the family dog. Next year, Hector hopes to attend Becker College, where he will pursue one of several animal science options. He has not fully decided but is thinking about becoming a veterinary technician or opening his own grooming shop.

Going Deep in a Burgeoning Field: Essex Tech’s Approach to Environmental Technology

Ann Witzig’s enthusiasm for teaching is palpable. With a background in marine sciences, she worked in environmental consulting on freshwater cleanup initiatives before making a switch to teaching. She joined the Essex Tech (known then as Essex Agriculture) faculty 12 years ago, helping to shape its Environmental Technology program and the state’s vocational frameworks for the subject. Witzig and her colleagues built their curriculum around what students would need to have a job with an environmental consulting firm or pursue a degree in environmental engineering. To ensure that students would get real depth, they carved the shop day up into college-style mini courses, with teachers specializing in their own areas of expertise.

Ninth and 10th graders take foundational courses in geology, plant identification, forest ecology, basic mapping, and aquaculture. During junior year, students choose to focus in marine sciences or natural resource management. Witzig teaches environmental chemistry and GIS mapping, training students to illustrate the data they collect on excursions to salt marshes, mud flats, and other natural habitats. An energy and sustainability course gets students into the engineering side of the field, and a new course on coastal resiliency, part of a collaborative project with the Massachusetts Audubon Society and the University of New Hampshire, gives students opportunities to work alongside professionals, studying the impact of storms and toxins on coastal areas and making recommendations to protect New England’s sensitive coastlines.

Nearly every graduate goes on to a four-year college, and pursues a degree in environmental science, forestry, marine biology, environmental engineering or a related field. The faculty are proud of the feedback they hear. Witzig says, “When they get to college, what we’re finding is that they’re two years ahead, and they’re getting jobs in laboratories — they’ve got lab skills — and they have computer skills, so they can get work with GIS mapping. ... They are ahead in maturity as well.”

Witzig and her colleagues spend a lot of time planning curricula and working to keep up with the latest approaches in the field. When faculty positions open up, the teachers are careful to select candidates who, like them, have a strong background in the sciences and are eager to keep learning. She says, “We want to give our kids the best that’s out there.”



About Achieve

Achieve is an independent, nonpartisan, nonprofit education reform organization dedicated to working with states to raise academic standards and graduation requirements, improve assessments, and strengthen accountability. Created in 1996 by a bipartisan group of governors and business leaders, Achieve is leading the effort to make college and career readiness a priority across the country so that students graduating from high school are academically prepared for postsecondary success. When states want to collaborate on education policy or practice, they come to Achieve. At the direction of 48 states, and partnering with the National Governors Association and the Council of Chief State School Officers, Achieve helped develop the Common Core State Standards. Twenty-six states and the National Research Council asked Achieve to manage the process to write the Next Generation Science Standards. Achieve has also served as the project manager for states in the Partnership for Assessment of Readiness for College and Careers, which are developing next generation assessments. And since 2005, Achieve has worked with state teams, governors, state education officials, postsecondary leaders and business executives to improve postsecondary preparation by aligning key policies with the demands of the real world so that all students graduate from high school with the knowledge and skills they need to fully reach their promise in college, careers and life. For more information about the work of Achieve, visit www.achieve.org.

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