

**New England Association of  
School and Colleges, Inc.**

**Commission on Public Schools**



**Commission on Public Schools**

**Collaborative Conference Visit Report for  
Massachusetts Academy of Mathematics and Science**

Worcester, MA

September 26, 2018 - September 27, 2018

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# School and Community Summary

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## School and Community Summary

The Massachusetts Academy of Math and Science was established by the Massachusetts State Legislature in 1992, as a school of excellence for academically accelerated students in grades 11 and 12. The Academy is a collaborative effort among the Commonwealth of Massachusetts, Worcester Polytechnic Institute (WPI), and state school districts, and serves the needs of 100 students per year (50 students in each of the two grades).

The main facility of the Academy is at 85 Prescott Street, in the Gateway Park area of downtown Worcester, MA, a city with a population of approximately 184,500. The Academy is housed in a renovated circa-1917 factory building, with the Academy on part of the ground floor of one section of the building, with medical offices and other professional offices, as well as offices and laboratories for WPI, throughout the rest of the building.

The 85 Prescott Street facility is the primary location for the Academy's 11th grade students; 12th grade students attend classes on WPI's campus which is a half-mile away but also has facilities in the Gateway Park within two hundred yards of the Academy. A free shuttle services operates between 85 Prescott Street and the main campus of WPI

Even though the Academy is open to residents of the entire state, the majority of students attending the Academy reside in the central Massachusetts county of Worcester. Nevertheless, the enrollment for 2017-8 included students from the following communities outside Worcester County: Medway, Tewksbury, Westford, Tyngsboro, Littleton, and Chelmsford. Residents of the City of Worcester typically comprise only 9 to 10 percent of the Academy's student population.

As part of the agreement with the Commonwealth (Legislative Bill # 70619624 - "School of Excellence"), the Academy is required to make every effort to maintain gender equity in its recruitment and acceptance of students. Also, part of the agreement is the stipulation that no public school districts are required to expend any funds for the costs of their students attending the Academy. As a result, the Academy operates as an autonomous "district," and is not under the oversight of any local school board of school committee.

The population of Worcester County is 819,589 (as of 2017), with the following race/ethnicity breakdown: 86.8 percent white, 11 percent Hispanic, 5.6 percent African American, 4.9 percent Asian, and 2.2 percent multi-racial. Of the adult population, 90 percent have completed high school or advanced beyond secondary school, 34.8 percent have completed bachelor's or higher-level degrees. The median annual household income is \$67,005 (for 2012 - 2016), and the unemployment rate is 3.4 percent (as of November 2017).

The maximum size of the student body at the Academy is fixed by the state legislature at 100 total students. Enrollment data for the 2017-8 academic year indicate a total of 96 students (50 in grade 11; 46 in grade 12), with 48 male students and 48 females students. Race/ethnicity data for the same year indicated the following composition of the student body: 45.8 percent Asian, 40.6 percent white, 9.4 percent multi-racial, 3.1 percent Hispanic, and 1.0 percent African American.

Based on the NEASC CPS Survey, 92.7 percent of Academy students live in a home where at least one adult has a four-year college degree or higher, and 63.7 percent live in a home where at least one adult has obtained a professional or graduate degree beyond college.

Attendance rates at the Academy are typically very high. Data for 2016-7 reveal a student attendance rate of 99.3 percent, with an average absence rate of 1.2 days per year. The graduation rate is consistently 100 percent, with all students attending four-year colleges or universities after graduation.

The Academy is considered both a public school district and a high school by the Massachusetts Department of Education. Administratively, the director of the Academy serves as both the superintendent and the principal. The teaching staff has six permanent faculty members - one each in mathematics, physics, humanities, computer

science, foreign languages, and STEM/science and technical writing (STW) - augmented by a full-time guidance counselor and an additional faculty member in a one to two-year visiting scholar position who assists in STEM I and STEM II. These eight faculty members serve as student advisors for juniors and seniors and also staff many of the Academy's extra-curricular programs. Additional staffing for extra-curricular programs, as well as for physical education classes, is provided by WPI faculty and outside instructors. The teacher-to-student ratio for an 11th grade class of 50 students is approximately 1:6. A part-time nurse, a part-time professional coordinator, and a full-time operations manager round out the rest of the professional staff at the Academy.

For administrative/advisory purposes, juniors are divided up into four homerooms (of 12-13 students each) with two faculty members assigned to each homeroom and meet during a 30-minute homeroom advisory period each day. For instructional purposes, juniors are divided up into three class sections of 16-17 students each. This division into sections is determined by the foreign language classes that students are placed in (Spanish or French).

Typically, classes meet for one-hour time blocks, beginning at 7:45 am and ending at 2:45 pm, with a 30-minute homeroom after the first two classes, and a 30-minute lunch period. These blocks can be shortened or lengthened as needed, or combined into all-school blocks for testing or presentation purposes. The daily school schedule is planned in advance on a week-to-week basis, according to the educational needs of students and the occurrence of special activities and events, and it is subject to immediate adjustment in the case of unforeseen events (e.g. snow days or snow delays).

Seniors take all their academic courses at WPI and carry a full college freshman academic load of 12 courses per year, spread out over the four academic terms. Academy seniors are required to take four courses in humanities (two of which must be literature or writing classes), four courses in mathematics, and four courses in science (including computer science and engineering).

Acknowledgement of individual and group achievements is an agenda item for the weekly all-school Monday morning meeting. In addition to acknowledging National Merit commendations and finalist recognitions, local/regional/state and international STEM Fair achievements, awards in computer programming and math competitions, writing and art contests participants, performance arts and sports achievements, the annual festival of student-made foreign language films, and accomplishments in other activities/events, these achievements are also publicly included in e-mails from the Academy director and are routinely posted on the Academy's website and Facebook pages.

At the end of the school year, the Academy selects juniors to receive merit-based book awards from colleges and designates graduating seniors to receive awards that include the Worcester Telegram Newspaper Student Achievement Award, the Mass Academy Community Service Award, and a scholarship award from the Greater Worcester Community Foundation.

## **Core Values, Beliefs, and Vision of the Graduate**

The following are the core values and beliefs about learning for the 2017-18 school year.

Core Values:

- Collaboration
- Intellectual curiosity
- Perseverance
- Student-centered learning
- Project-based learning
- A supportive community-based environment

Beliefs About Learning:

- All students have the potential to achieve
- Students learn best when given the opportunity to teach others in a collaborative environment
- Students acquire a deeper knowledge through interactive project-based learning experiences
- Optimal learning occurs in a safe, supportive community that maintains high expectations.

Vision of the Graduate:

- Forward-thinking
- Innovative
- Inquisitive
- Confident

The Mass Academy Graduate is a creative problem-solver and life-long learner who is passionate and resilient when facing challenges and pursuing new opportunities, excels in both independent and collaborative learning environments, is able to transfer and apply extensive knowledge and skills to new situations, and is responsive to - and respectful of - the diversity of others.

Academic/Intellectual Attributes: knowledge, understanding, creativity, resourcefulness, organization, inquisitiveness, innovation, advanced skills in technology, oral and written discourse

Interpersonal Skills: independence, collaboration, leadership

Civic/Ethical Behaviors: responsibility, trustworthiness, empathy, responsiveness, altruism

Personal Attributes: confidence, open-mindedness, self-motivation, reflectiveness, perseverance, adaptability

# LEARNING CULTURE

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## Learning Culture

*The school provides a safe learning culture that ensures equity and fosters shared values among learners, educators, families, and members of the school community. These shared values drive student learning as well as policy, practice, and decision-making while promoting a spirit of collaboration, shared ownership, pride, leadership, social responsibility, and civic engagement. The school community sets high standards for student learning, fosters a growth mindset, and facilitates continuous school improvement to realize the school's core values, beliefs about learning, and vision of the graduate.*

1. The school community provides a safe, positive, respectful, and inclusive culture that ensures equity and honors diversity in identity and thought.
2. The school's core values, beliefs about learning, and vision of the graduate drive student learning, professional practices, learning support, and the provision and allocation of learning resources.
3. The school community takes collective responsibility for the intellectual, physical, social, and emotional well-being of every student and can demonstrate how each student is known, valued, and connected to the school community.
4. The school community's professional culture demonstrates a commitment to continuous improvement through the use of research, collaborative learning, innovation, and reflection.
5. The school's culture promotes intellectual risk taking and personal and professional growth.
6. The school has an inclusive definition of leadership and provides school leaders with the authority and responsibility to improve student learning.
7. The school culture fosters civic engagement and social and personal responsibility.

# STUDENT LEARNING

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## Student Learning

*The school has a vision of the graduate that includes the attainment of transferable skills, disciplinary/interdisciplinary knowledge, understandings, and dispositions necessary to prepare learners for their future. Students are assured consistent learning outcomes through a defined curricular experience and have the opportunity to demonstrate their skills and knowledge in a variety of creative ways. Students actively participate in authentic learning experiences while practicing the skills and habits of mind to regularly reflect upon, and take ownership of, their learning.*

1. The school has a vision of the graduate that includes the attainment of transferable skills, knowledge, understandings, and dispositions necessary for future success and provides feedback to learners and their families on each learner's progress in achieving this vision.
2. There is a written curriculum in a consistent format for all courses in all departments that includes units of study with guiding/essential questions, concepts, content, and skills and integrates the school's vision of the graduate.
3. Curriculum ensures that learners demonstrate a depth of understanding over a breadth of knowledge.
4. Instructional practices are designed to meet the learning needs of each student.
5. Students are active learners who have opportunities to lead their own learning.
6. Learners regularly engage in inquiry, problem-solving, and higher order thinking skills.
7. Learners demonstrate their learning through a variety of assessment strategies that inform classroom instruction and curriculum.
8. Learners have multiple opportunities to demonstrate their learning, receive corrective feedback, and use this feedback in meaningful ways to support their learning.
9. Learners use technology across all curricular areas to support, enhance, and demonstrate their learning.

# PROFESSIONAL PRACTICES

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## Professional Practices

*The school maintains and implements a school improvement/growth plan, organizational practices, and productive community relationships to meet and support student learning needs. Educators engage in ongoing reflection, collaboration, and professional development to improve their practice and examine evidence of student learning and well-being to improve curriculum, instruction, assessment practices, programs, and services.*

1. The school engages all stakeholders in the development and implementation of a school improvement/growth plan, which reflects the school's core values, beliefs about learning, and vision of the graduate.
2. Educators engage in ongoing reflection, formal and informal collaboration, and professional development to improve student learning and well-being.
3. Educators examine evidence of student learning and well-being to improve curriculum, instruction, assessment practices, and programs and services.
4. Collaborative structures and processes support coordination and implementation of curriculum.
5. School-wide organizational practices are designed to meet the learning needs of each student.
6. Educators develop productive student, family, community, business, and higher education partnerships that support learning.

# LEARNING SUPPORT

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## Learning Support

*The school has timely, directed, and coordinated interventions for all students. The school provides targeted supports to meet each student's individual needs, including counseling services, health services, library/information services, and other appropriate support services to assist each student in meeting the school's vision of the graduate.*

1. All students receive appropriate intervention strategies to support their academic, social, and emotional success.
2. All students receive counseling services that meet their personal, social, emotional, academic, career, and college counseling needs from adequate, certified/licensed personnel.
3. All students receive health services that ensure their physical and emotional well-being from adequate, certified/licensed personnel.
4. All students receive library/information services that support their learning from adequate, certified/licensed personnel.
5. Identified English Language Learners and students with special needs and 504 plans receive appropriate programs and services that support their learning from adequate, certified/licensed personnel.

# LEARNING RESOURCES

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## Learning Resources

*The school has adequate and appropriate time, funding, and facilities to support the realization of its core values, beliefs about learning, and vision of the graduate. The school and school community provide time, funding, and facilities for student learning and support; teacher collaboration and professional growth; and full implementation of curricular and co-curricular programs in the school. The school has appropriate plans, protocols, and infrastructure in place to ensure consistent delivery of its curriculum, programs, and services.*

1. The community and district provide school buildings and facilities that support the delivery of high-quality curriculum, programs, and services.
2. The school/district provides time and financial resources to enable researched-based instruction, professional growth, and the development, implementation, and improvement of school programs and services.
3. The community and the district's governing body provide adequate and dependable funding to fully implement the curriculum, including co-curricular programs and other learning opportunities.
4. The school/district has short-term and long-term plans to address the capital and maintenance needs of its building and facilities.
5. The school has infrastructure and protocols in place to ensure effective responses in crisis situations.

# Introduction

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## Introduction

The New England Association of Schools and Colleges (NEASC) is the oldest of the six regional accrediting agencies in the United States. Since its inception in 1885, the Association has awarded membership and accreditation to those educational institutions in the six-state New England region who seek voluntary affiliation.

The governing body of the Association is its Board of Trustees, which supervises the work of three Commissions: the Commission on Independent Schools (CIS); the Commission on Public Schools (CPS), which is comprised of the Committee on Public Secondary Schools (CPSS), the Committee on Technical and Career Institutions (CTCI), and the Committee on Public Elementary and Middle Schools (CPEMS); and the Commission on International Education (CIE).

As the responsible agency for matters of the evaluation and accreditation of public school member institutions, CPS requires visiting teams to assess the degree to which schools align with the qualitative Standards for Accreditation. The Standards are *Learning Culture, Student Learning, Professional Practices, Learning Support, and Learning Resources*.

The accreditation program for public schools involves a five-step process: the self-reflection conducted by stakeholders at the school; the Collaborative Conference visit, conducted by a team of peer educators and NEASC representatives; the school's development and implementation of a growth/improvement plan; the Decennial Accreditation visit conducted by a team of peer educators and NEASC representatives; and the follow-up program carried out by the school to implement the findings of its own self-reflection, the recommendations of the visiting team, and those identified by the Committee in the follow-up process. Continued accreditation requires that the school participate in the accreditation process over the ten-year cycle and that it show continued progress addressing identified needs.

### Preparation for the Accreditation Visit - The School Self-Reflection

Accreditation coordinators and a steering committee comprised of the professional staff were appointed to supervise the school's self-reflection and Accreditation process. At Massachusetts Academy of Math and Science, a committee of twelve members, including the principal, supervised all aspects of the Accreditation process. The steering committee organized an appropriate committee or committees to determine the quality of all programs, activities, and facilities available for young people by completing the school self-reflection.

Public schools evaluated by the Commission on Public Schools must complete appropriate materials to assess their alignment with the Standards for Accreditation and the quality of their educational offerings in light of the school's core values, beliefs, vision of the graduate, and unique student population. Massachusetts Academy of Math and Science used questionnaires developed by the Commission on Public Schools to reflect the concepts contained in the Standards for Accreditation. These materials provided discussion items for a comprehensive assessment of the school by the professional staff during the self-reflection.

In addition, the professional staff was required to read and vote on Part 2 of the self-reflection to ensure that all voices were heard related to the alignment of the school to the Standards for Accreditation. All professional staff members were expected to participate in the self-reflection process either by participating on a committee or by participating in discussion and evidence gathering to support the school's alignment to the Standards.

### The Process Used by the Visiting Team

A visiting team of three members was assigned by the Commission on Public Schools to conduct a Collaborative Conference visit to Massachusetts Academy of Mathematics and Science. The visiting team members spent two days in Worcester, MA; reviewed the self-reflection documents, which had been prepared for their examination;

met with administrators, teachers, other school and system personnel, students and parents; and visited all classes to determine the degree to which the school aligns with the Committee on Public Secondary Schools' and Public Elementary and Middle Schools' Standards for Accreditation. The team also reviewed the proposed priority areas for the school's growth plan to be developed as part of the Accreditation process.

Each conclusion in the report was agreed to by visiting team consensus. Sources of evidence for each conclusion drawn by the visiting team are included within each section of the report. The report includes commendations and recommendations that, in the visiting team's judgment, will be helpful to the school as it works to improve teaching and learning and implement its plan for growth and improvement.

This report of the findings of the visiting team will be forwarded to the Committee on Public Secondary Schools or the Committee on Public Elementary and Middle Schools, which will make a decision on the Accreditation of Massachusetts Academy of Math and Science.

# Foundational Element Ratings

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## Foundational Element Ratings

Foundational Elements	School's Rating	Visitors' Rating
1.1a - Learning Culture	Meets	Meets
1.2a - Learning Culture	Meets	Meets
2.2a - Student Learning	Does Not Meet	Does Not Meet
3.1a - Professional Practices	Meets	Meets
4.1a - Learning Support	Meets	Meets
5.1a - Learning Resources	Meets	Meets

# Foundational Element 1.1a - Learning Culture

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## Narrative

The school community provides a safe environment. The Academy provides a safe environment for its students attending classes and programs both at its 85 Prescott Street facility and the WPI Campus. This is verified by annual School Safety and Discipline Reports and NEASC CPS Surveys. The most recent School Safety and Discipline Report indicates no incidents during the 2017-2018 academic year. In the CPS Surveys, 100 percent of students, 100 percent of parents, and 100 percent of faculty members responded that they felt safe at the school.

The school has a double locked foyer to ensure safety. The Academy pays meticulous attention to securing access to the building, and provides a high level of personalization and regard for each student demonstrated by the operations manager whose vigilance at the reception desk was consistently exemplary; serving as another indicator of the school's holistic approach to providing physical, academic, and social emotional safety for its staff and students.

## Rating

Meets

# Foundational Element 1.2a - Learning Culture

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## Narrative

The school community has a written document describing its core values, beliefs about learning, and vision of the graduate. The Academy has clearly articulated documentation of its core values, beliefs about learning, and vision of the graduate. This information is found in the Academy student handbook and is accessible on its website.

As noted in the CPS survey, 100 percent of the faculty, 97 percent of families, and 95 percent of students are familiar with the school's core values and beliefs about learning. The same high percentage exists with 100 percent of the faculty, 96 percent of families and 86 percent of students indicating they are familiar with the school's vision of the graduate. The universal application of these core values and vision of the graduate in all aspects of the school including academic, behavioral, and civic expectations shared and supported by all constituent groups is impressive.

## Rating

Meets the Standard

# **Foundational Element 2.2a - Student Learning**

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## **Narrative**

There is a written curriculum in a consistent format for all courses in all departments across the school. There is a written curriculum for all courses in each academic area in the school. Because of the size of the school, and the fact that each academic area is a singleton, the faculty recognizes the need for some consistency within the school in format while maintaining the flexibility to innovate within each subject area independently. This balance, while presenting a challenge, is a goal for growth in the upcoming year.

The work towards charting consistency for the junior year academic program is well underway with clear objectives and target dates. The goal to complete this task by May 31, 2019 is achievable given the high level of cooperation and communication among the faculty. The overarching and unifying mantra of their collaboration is to work towards consistency while honoring the essentially formative and organic nature of discovery based learning that is a driving principle at the Academy.

## **Rating**

Does Not Meet the Standard

# **Foundational Element 3.1a - Professional Practices**

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## **Narrative**

The school has a current school improvement/growth plan. The current school improvement plan is posted on the Academy website. The school improvement plan reflects a high level of collaboration and fidelity to the school's mission and vision for the graduate. The Academy is well on its way to implementing its growth plan and considers it a living document charting its future while bringing forth best practice from its 26 years of success.

## **Rating**

Meets the Standard

# Foundational Element 4.1a - Learning Support

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## Narrative

The school has intervention strategies designed to support learners. The Academy guidance counselor is the primary resource for faculty in facilitating accommodations for students with IEP and 504 plans and other identifiable learning issues. When needed, such accommodations are implemented in both classroom environments and testing situations. The Academy also has a formal Student Success Plan for juniors who are experiencing difficulties related to academic content and skills, organization and time management, and other issues affecting academic performance.

Intervention strategies for seniors include the submission of weekly advisory forms and one-on-one advisory sessions with faculty, as well as the monitoring of individual mid-term progress reports submitted by each WPI campus instructor. Seniors are also provided with on-campus mentoring and tutorial assistance through the resources of WPI's Math and Science Help (MASH) program and writing center.

Beyond the services of the counselor, all members of the staff serve as advisors. There are at least three components of the advisory groups, all focused on providing support, citing the need for intervention and maximizing the school's commitment to personalization. The NEASC survey reported that 100 percent of the faculty take responsibility for both the the academic well-being as well as the social and emotional welfare of their students. Results from students indicate that 79 percent of students know who to go to when they need social-emotional support, and 88 percent indicate the counselor is available when they need help. The school is looking at the potential need for additional support services to augment the work of the current counselor whose focus includes academic counseling, secondary planning, and academic and social-emotional interventions.

## Rating

Meets the Standard

# **Foundational Element 5.1a - Learning Resources**

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## **Narrative**

The school site and plant support the delivery of curriculum, programs, and services. The faculty and students make optimal usage of both the 85 Prescott Street space and the campus facilities at WPI to maximize the delivery of curriculum, programs, and services. The presence of multiple-use areas and the availability of staff, materials, equipment, and other resources at both locations enhance the overall educational outcome.

The students are provided with an array of learning opportunities through the collaborative relationship with Worcester Polytechnic Institute. This relationship creates not only access to library, labs, and physical education facilities on the WPI campus, but also tech support, and presence and services on site at 85 Prescott Street. Specifically, the librarian from WPI works with students on the Academy campus on a regular basis.

## **Rating**

Meets the Standard

# Standard 1 - Learning Culture

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## Narrative

The school provides a safe, positive, respectful, and inclusive culture that ensures equity and honors diversity in identity and thought. All stakeholders at the Academy affirm and model the essential elements of the school's core values of collaboration, intellectual curiosity, perseverance, student centered thinking, project-based learning, and the provision of a supportive community based environment. As this unique and dynamic school community is founded on fidelity to these values, it is united in its commitment to its vision of the graduate which is defined as forward thinking, innovative, inquisitive, and confident. Students, faculty, and the leadership team are deeply committed to what they value, as they articulate a passion borne from their shared understandings of meaningful application of knowledge and understanding and the power of collaboration and support throughout the learning process. The level of authenticity is stunning.

Physical safety is a priority and is ensured through the implementation of effective security protocols which include access to emergency services, compliance with safety regulations, and staff training. Evacuation and lockdown protocols are defined and practiced by staff and students. The school has requested and is waiting to receive further recommendations approval from the WPI police regarding finalizing the lockdown protocol. The NEASC survey results indicate that 100 percent of faculty, 100 percent of families, and 98 percent of students feel safe at the Academy. There is a Campus Emergency Guide for WPI posted throughout the school. Teachers and administration confirm that they practice lockdowns, evacuations, and protocols invoked by the presence of a school intruder. All doors are locked, and the lobby has a double entrance with two locked doors. Campus police survey the area used by the Academy as part of their rounds. It should be noted that the presence of the operations manager at the front desk reception area is a significant and universally valued element of school security and serves as an indicator of the school's commitment to a holistic safety plan.

Diversity in identity and thought is a shared priority among members of the school community. The small size of the Academy fosters multiple levels of personalization, bonding, and communication. Each year, the junior class attends a three day orientation held at Camp Bournedale during the first week of school in September. During this time, Academy staff connect with students exploring and explaining academic opportunities and pathways while articulating the avenues of social and emotional support. The advisory model is strengthened by the Bournedale retreat. The incoming class of 50 is divided among 4 equal groups for advisory. These advisory groups meet with two faculty advisors each day. During an all school Day of Diversity on the Friday before Martin Luther King, Jr. Day, each student gives a presentation celebrating his or her ethnicity. The NEASC survey notes that 100 percent of families feel that people at the Academy treat students with different backgrounds with respect, and 98 percent of students felt welcome at the Academy.

The core values and vision of the graduate determine the focus and functions that the Academy successfully maintains, as the responses to the 2018 survey of graduates support. The percentages of alumni responding "Extremely Well," "Very Well," or "Moderately Well" to how the Academy prepared them for the nine targeted areas at the heart of the Academy's vision of the graduate were as follows: critical thinking skills, 98.9 percent; collaboration, 100 percent ; resilience/grit, 96.5 percent ; communication skills, 90.8 percent; innovation skills, 94.2 percent ; outside-the-box thinking, 95.4 percent; global/civic responsibility, 81.61 percent; leadership skills, 90.8 percent; and content knowledge, 96.6 percent.

The school's core values, beliefs about learning, and vision of the graduate drive student, professional practices, learning support, and the provision and allocation of learning resources. Learning resources of the Academy are used to enable Academy students to participate in local, regional, and national fairs and conferences, to ensure the purchase of laboratory and class materials/equipment, and enable teachers to pursue professional development programs that help support them and their students. Classes are scaffolded to promote increasing independence during junior year and prepare students for college-level work at WPI in their senior year. Students are also routinely given options so that they can take ownership of their own learning and become confident in their achievements. This is particularly true in math and physics during junior year and for students in all academic areas during senior year.

Collaboration and project based learning and corresponding project based assessments are essential to student learning at the Academy, and are continually stressed across all curriculum and extra-curricular programs. This is evident in the absence of conventional student desks and in the use of tables and modular furniture throughout the classroom and work areas in the Academy, and it is reflected in the learning activities designed to maximize student engagement.

The school has a written document describing its core values, beliefs about learning, and vision of the graduate. Results of the NEASC survey indicate that 100 percent of the faculty are familiar with the school's core values and beliefs about learning while 100 percent of the faculty express their familiarity with the school's vision of the graduate. The response from families indicates that 97 percent are familiar with the school's core values and beliefs while 96 percent are familiar with the school's vision of the graduate. The results from student surveys indicate that 93 percent are familiar with the school's core values and beliefs and that 93 percent express familiarity with the school's vision of the graduate.

The school community takes collective responsibility for the intellectual, physical, and emotional well-being of every student and can demonstrate how each student is known, valued, and connected to the school community. The results of the NEASC survey indicate that 89 percent of students feel valued at the school and that 91 percent feel connected to other students. There are Campus Emergency Guides posted throughout the school. The guide includes an individual section on responses for students in distress. This guide is written from the perspective of the WPI students on the WPI campus. Teachers at the Academy demonstrate a strong sense of family and unity between and among students and staff, and adhere to established protocols including role definition regarding students in crisis at the Academy. Teachers meet for two hours each week as a whole faculty. At this time, there is time dedicated to identifying students with existing or emerging social and emotional needs as well as time to discuss strategies to support those students. Teachers felt that if a student was experiencing signs and symptoms of personal crisis, he or she would go to a member of the staff. The humanities teacher discussed weekly journals where students know their journals are a safe place to confide personal issues with the understanding that she, as reader, is a mandated reporter and will offer support and provide appropriate referrals to the guidance counselor and to the director who will take appropriate steps in case management. The Emergency Report Plan is posted at the main entrance to both WPI and the Academy. It is also located at the Director of the Academy's phone station. In its opening paragraph, the Emergency Response Plan states that emergency services are provided to MA Academy of Math and Science by Worcester Polytechnic Institute's EMS and Campus Police which have clearly defined delineated procedures. The plan includes a link to emergency services and phone numbers. The NEASC survey reports that 97% of the students now what to do in a crisis and 100% of the students reported that the adults in the school know what to do in a crisis. The Emergency Response Plan is exceptionally thorough providing careful attention to essential plan components, purpose, process, ongoing training, examples of a school related crisis, timely and accurate communication, state of emergency, curriculum, phone numbers, and chain of command. The director indicated that the faculty is trained on crisis management from beginning to end including procedures to be used for off campus activities including field trips, and summer camps. The plan includes clearly defined and delineation of responsibilities. The director gave examples of seniors who may struggle with situations resulting in extended absences, for example medical issues such as concussions. He praised both the faculty at the Academy as well as the WPI faculty for the care and attention given to students while they are recovering from medical needs including injuries that impact their readiness to learn. The school community's professional culture demonstrates a commitment to continuous improvement through the use of research, collaborative learning, innovation, and reflection. The school community's professional culture is imbued with a commitment to continuous improvement through the use of research, collaborative learning, innovation, and reflection. This is borne out by the findings of the NEASC Survey revealing that 97 percent of Academy students view their teachers as being open to trying new ideas and 100 percent of Academy teachers use project-based and collaborative learning in their classes. The importance of research and the use of specific, measurable, achievable, results-oriented, and time-bound goals are also reinforced for students across all curriculum areas. All juniors engage in individual research projects for STEM I, which are then presented at a formal STEM fair, where projects are judged by outside professionals, with Academy students subsequently advancing to regional, state, national, and even international levels of STEM competition. This program is supported by the entire school community, with teachers in every discipline serving as STEM advisors for small groups of students. Students also write a 20-page STEM paper, which they are encouraged to submit to a variety of contests.

The Academy community's professional culture demonstrates a clear commitment to continuous improvement through the use of research, collaborative learning, innovation, and reflection. Based on the results of the NEASC CPS surveys, 97 percent of students, 100 percent of parents, and 100 percent of teachers concur that Academy teachers are eager to try new ideas. Collaboration and innovation are integral to the Academy program. In the alumni survey, 100 percent of the respondents indicated that the Academy prepared them moderately to extremely well in the area of collaboration skills, and 94.3 percent indicated that the Academy prepared them moderately to extremely well regarding innovation skills. The data from an end-of-the-school-year student evaluation that focuses on individual academic programs, as well as the Academy as a whole, is examined and discussed by the faculty at the end of each school year as both a diagnostic assessment and a prescriptive tool for implementing improvements.

The school uses supervision and evaluation protocols aligned with the MA Model for Educator Evaluation. A focus on continuous improvement is also incorporated into each teacher's annual evaluation, implemented in accordance with WPI's "SMART" assessment instrument, which requires specific, measurable, achievable, results-oriented, and time-bound prescriptive criteria for all professional goals. Teachers at the Academy engage in goal setting using SMART goals. These goals are intended to be re-visited by the employee and the supervisor regularly throughout the year so that progress toward achieving the goals can be monitored. Summative evaluations are organized according to the four Massachusetts standards of curriculum, planning and assessment; teaching all students; family and community engagement; and professional culture. In addition, the director integrates data gleaned from the end of year surveys completed by all juniors regarding all their teachers. He shares the data with each teacher privately. Examples of survey questions include but are not limited to: "Please respond to the following statements at MA Academy learning outcomes are clearly articulated in each class ( what knowledge and skills will I acquire by taking each course), I received timely and useful teacher feedback to support learning in my class, please share any positive feedback about your learning experience in this class, what changes would improve your learning experience in this class and why? There are also sets of questions specific to academic areas of Physics, Humanities, Computer Science, French, Spanish, Math Modeling, and STEM."

Innovation in education is a priority of the Academy, by virtue of the 1992 legislative bill that established Mass Academy as a school of excellence with the expressed mandate to be a model of innovative teaching for fellow educators - a responsibility that the Academy consistently fulfills. For example, from January 2017 to January 2018, Academy teachers delivered more than 1,000 hours of professional development in STEM education, mathematics, technology, CAD, physics, wellness, foreign languages, and computer science to more than 670 colleagues. In addition, the director of the Academy is a past officer and current president of the National Consortium of Specialized STEM Schools (NCSS), the math teacher is an officer on the Worcester County Math League, and the STEM teacher serves as a member of the Board of the Worcester Regional Science and Engineering Fair.

The school's culture promotes intellectual risk taking and personal and professional growth. The Academy courses routinely highlight the process rather than the product involved in learning, which tends to lessen students' fear of getting the wrong answer and supports the principle of learning through failure in order to achieve higher goals. Project-based learning in physics and STEM II classes, modeling in mathematics classes, immersion-based foreign language classes, and open-ended writing assignments in humanities and science and technical writing reinforce this approach. In addition, low-stress after-school extracurricular activities allow students to experiment and develop skills without the pressure of a grade or assessment.

This approach to the importance of learning how to learn is reflected in the report card grading system used at the Academy. For A term, students do not receive any grades; instead, they receive narratives that comment on their progress and "habits of mind" as they relate to each individual course. For B term, students receive letter grades without any comments, (unless a student has a grade of C or lower in an individual course). For C term, students receive both a letter grade and a comment for each course. And for D term, all students receive final letter grades which become the grades that are recorded on their official transcripts.

Based on the NEASC CPS surveys: 99 percent of students indicate that they have learned that mistakes are part of the learning process, with 98.9 percent feeling that they have been encouraged to try new things or

experiment, and 100 percent of parents believe that their children have learned that mistakes are part of the learning process and that their children are encouraged to try new things and to experiment.

The school has an inclusive definition of leadership and provides school leaders with the authority and responsibility to improve student learning. The results of the NEASC survey indicate that 100 percent of the faculty feel they are given important leadership opportunities, and 87 percent of the students feel that they have been given important leadership roles agreeing that the principal and other school leaders seek and respect their input in how to make the school better. The flowchart of designated responsibilities indicates that director of the Academy is supervised by a dean of undergraduate education at WPI. The relationship between the Academy and the administration at WPI is extremely positive and productive. The director and the dean meet on a regular basis and the meetings frequently take place at the Academy affording those in higher education the opportunity to get to know the students and Academy staff and to gain insight and appreciation for their work. She noted that WPI provides support through the office of government and community relations help seek continued funding at the state level. The President of WPI has mentioned the importance of this endeavor in talking with the legislature about the importance of the STEM pipeline. The Director of MA Academy serves as a strong and articulate advocate and spokesman for the Academy. Teachers at the Academy fill many roles including data management and analysis, Naviance, scheduling, advising extra curricular activities, and trouble shooting technology. In addition, all staff serve as advisors to students. Many take responsibility for supervising and managing the maker space which includes supporting students in their facility with Solidworks.

The school culture fosters civic engagement, and social and personal responsibility. The NEASC survey indicates that 94 percent of students agree that their teachers help them apply knowledge to real life situations. Program outreach has been enhanced through affiliations and partnerships with global organizations, such as e-NABLE (in which students create 3D-printed hands for disabled children) and Apps for Good (in which students develop mobile apps to solve real-world problems), the national CyberPatriot education program, the Seven Hills Foundation (a regional agency providing support and services to children and adults with disabilities and life challenges), and the WPI biotechnology department. Student report a deep commitment among students to engaging in meaningful work. One student described the satisfaction she feels when she is given the opportunity to solve real world problems and to contribute to the Worcester community as well as to the global community. She talked with grace about designing assistive technology products and using her knowledge and skills to help residents through the Seven Hills Foundation and to designing and making hand prosthesis for children around the world. A WPI senior, who attended the Academy, talked with pride and respectful nostalgia about her STEM project her junior year at the Academy which was an epi-pen connected through blue-tooth which would alert emergency personnel when the epi-pen was deployed. She noted that she has had several job interviews and still speaks to the impact of the Academy on her ability to develop solution based thinking and the supportive environment which encouraged her every step of the way.

## Sources of Evidence

- classroom observations
- facility tour
- NEASC survey
- parents
- school leadership
- school support staff
- self-reflection
- student work
- students
- teacher interview
- teachers

# Standard 2 - Student Learning

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## Narrative

The Massachusetts Academy of Mathematics and Science has a vision of the graduate that includes the attainment of transferable skills, disciplinary/interdisciplinary knowledge, understandings, and dispositions necessary to prepare learners for their future. Students are assured consistent learning outcomes through a defined curricular experience and have the opportunity to demonstrate their skills and knowledge in a variety of creative ways. Students actively participate in authentic learning experiences while practicing the skills and habits of mind to regularly reflect upon, and take ownership of, their learning.

The school has a vision of the graduate that includes the attainment of transferable skills, knowledge, and understandings, and dispositions necessary for future success. The faculty was deeply engaged in the composition and implementation of the vision of the graduate. When developing the vision of the graduate, the faculty did so with an eye to making it authentic and realistic. Attention was given to ensuring that the vision included transferable skills that are measurable and attainable and which are embedded in the Academy's curriculum, as well as its instructional and assessment practices. In addition, items related to the vision were subsequently incorporated into the annual end of year survey given to the graduating class of 2018. The results of the NEASC survey reveal that 90 percent of the faculty, 98 percent of the families, and 86 percent of the students were familiar with the vision of the graduate.

There is a written curriculum for all courses in all departments that includes units of study with guiding/essential questions, concepts, content and skills, and integrates the school's vision of the graduate. The NEASC survey indicates that 100 percent of the faculty agree that their lessons are aligned with the written curriculum and 100 percent reported that they provide students with a course syllabus or outline of all topics covered in their respective courses.

While there is a written curriculum for all courses in all departments, faculty recognized a need for providing consistency. In the spring of 2018, the acknowledgement of a need for consistency in the design and formatting of the Academy's junior year curriculum documents led to the establishment of curriculum writing sessions, with focus on using a modified Understanding by Design template. The faculty was tasked with initiating revisions of the curriculum over the 2018 summer break with the goal of completing the updated curriculum documents during the 2019- 2020 school year. The target date for submitting the completed curriculum is on or before May 31, 2020.

The curriculum ensures that learners demonstrate a depth of understanding over a breadth of knowledge. The results of the NEASC survey indicate that 96 percent of students feel the emphasis on project-based learning helps them think deeply. One hundred percent of families feel that teachers emphasize deep thinking rather than just the memorization of facts. The unique nature of the one year academic program taught at the Academy necessitates that students access prior knowledge and apply this knowledge to new learning modes that emphasize deep understanding, higher order thinking skills, and transferable learning dispositions- all of which conform to the school's vision of the graduate. The curriculum is fueled by the guiding/essential questions in order to solidify concepts, content, and skills that directly align with the Academy's vision of the graduate. These academic experiences incorporate naturally aligned interdisciplinary learning in math, physics and STEM I/STEM II using project-based and authentic learning environments that are driven by a focus on essential and guiding questions. Demonstration of depth of understanding and evidence of student mastery occurs in the student presentations that are embedded in all academic areas and are assessed through the use of school-wide presentation rubrics. Results from the NEASC survey indicate that 80 percent of the faculty feel that the present curriculum includes development of transferable skills and dispositions that ensure future success. Ninety-seven percent of families and 98 percent of students feel the school has a clear vision of the knowledge and skills needed for students to be successful in life.

Instructional practices at the Academy are somewhat designed to meet the needs of each student. As evidenced in classroom observations, there is some differentiation and personalization particularly in the areas of math,

physics and foreign language. The NEASC survey reports that 71 percent of students commented that teachers allow them to learn at their own pace. The small class sizes at the Academy help facilitate teachers ability to differentiate, individualize, and to personalize instruction base on student backgrounds, needs, and interests through the continual use of formative assessments to adjust instruction where needed. Project-based learning and small group and paired activities occur in all academic areas and are specifically designed to suit individual student's strengths and needs.

Students at the Academy are active and engaged learners whose experiences are marked by pervasive opportunities for them to direct their own learning in a relevant and authentic manner. Students are given wide-ranging latitude in selecting their own areas of investigation, exploration, and expression for projects in all academic areas, all of which occur in an environment that is infused with collaboration, constructive discourse, and self-reflection. Students stated that they are thoroughly engaged in learning and in the process of learning, a sentiment echoed by their parents. Some opportunities are geared as outreach opportunities whereby students can use the resources of the school and their skills to better the larger community outside of the school, such as work with prosthetics or with the Seven Hills Foundation in Worcester. Students are explicitly taught how to balance their passions for learning, research, and extracurricular activities through projects such as the development of a project planning calendar in the STEM class, a message that is reinforced in conversations with their homeroom and STEM advisors.

Throughout these opportunities and in every class at the Academy, students are consistently engaged in inquiry, problem-solving, and higher order thinking skills. Each class engages students both individually and cooperatively to further their depth of understanding, analysis, synthesis, and creativity. Students routinely applaud each other for taking academic risks, sharing their insights, and recognizing the value of learning from experimentation. Indeed, the school has a display of failures outside the 3D modeling room in order to encourage students to value mistakes they and their peers make and learn from. Students question each other and challenge each other about their decisions in a collegial manner. After a presentation in one Humanities class, students questioned the presenting students' decision to omit the Great Wall of China as a notable achievement of ancient China. The resulting discourse allowed all students to better understand the presenters' definition of the period and criteria for what constitutes a notable achievement. In a Spanish class where some students were new to the language, and others had prior academic exposure, one table of learners spontaneously celebrated a novice learner's first joke in Spanish. When asked, the students all agreed that it was hard to make jokes in a new language. In physics, students are encouraged to solve problems with either algebra or calculus, depending on their mathematical comfort, but are encouraged to try the calculus problems even if they are nascent learners in calculus. Most students in a calculus class were working on the calculus based problems because of the deliberate "low risk, high challenge" opportunity that was offered.

Students at the Academy experience a variety of formal and informal assessment strategies that inform them on their emerging mastery of skills and content, inform instructional practices, and help to assess the effectiveness of the curriculum. These include pre-unit self-assessment surveys in individual classes, global assessments in the form of student surveys on such issues as homework and student workload, and also include course and school evaluations done at the end of the school year. The use of school-wide rubrics for presentations in all academic areas and the use of project focused rubrics in specific academic areas reinforce this principle. Teachers reported using a wide variety of assessment strategies including portfolio assessments and differentiated assessments for students with different skill levels in order to help all students grow. In the first term of a student's junior year, which is the first year at the Academy, students receive narrative feedback from each teacher instead of traditional grades. This is done to allow students to understand their strengths and challenges without the formal rating of a grade and to impress on students that assessments are used to encourage growth at the Academy. Even when grades are introduced, students report that this type of narrative feedback about growth is the most valued at the Academy. This is consistent with the school's vision of the graduate and desire to promote authentic learning experiences. The NEASC survey indicates that 91 percent of families and 84 percent of students agree that teachers use a variety of assessments.

In classes, students are given constant and explicit feedback on their mastery of content, and on their mastery of other skills such as presentation, collaboration, and effort. Since students come to the school with disparate skills and experiences, this regularity of feedback and support plays an integral part in helping each student make progress and internalize the vision of the graduate for the Academy. Peer feedback, both accolades and

criticism, is valued by students as part of the collaborative process and seen as part of "how we work together." Students have the time, opportunity, and encouragement of teachers to revise and to improve their work. Multiple iterations, in trying to learn a skill or produce a product, are seen as part of the process at the Academy. Students and parents report that this is most apparent in the junior year, when the classes are taught by Academy teachers. Once students transition to taking classes at WPI, they continue to experience a variety of assessments but must become more adept at advocating for feedback from university professors and reaching out to these instructors during office hours.

Technology is integrated into the learning environment in ways that allow its use to be transformative for students. Students and teachers use a variety of technology, including round tables as an organizing methodology for class, 1:1 laptops, classroom desktop computers, interactive whiteboards and short throw projectors, 3D printers, and Arduino microcontrollers. The use of technology represents an informed choice by the students and the teachers; notably, no students were observed using social media in the learning environment. Students spoke about technology as a way to effect change and to solve problems: the computer could run a million iterations of a model to check for errors; the 3D printer could be used to produce something that might assist a specific disability. In the formal curriculum and in informal discussions, teachers and students spoke about technology as a tool not a goal, and emphasized that the tool should be selected responsibly to meet the goal's "criteria for success".

## **Sources of Evidence**

- classroom observations
- NEASC survey
- parents
- school leadership
- school support staff
- self-reflection
- students
- teacher interview
- teachers

# Standard 3 - Professional Practices

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## Narrative

The school maintains and implements a school improvement/growth plan, organizational practices, and productive community relationships to meet and support student learning needs. Educators engage in ongoing reflection, collaboration, and professional development to improve their practice and examine evidence of student learning and well-being to improve curriculum, instruction, assessment practices, programs, and services.

The school engages stakeholders in the development and implementation of a school improvement/growth plan, which reflects the school's core values, beliefs about learning, and vision of the graduate. The director, faculty, parents, and students were involved in the process of developing the 2017 school improvement plan. The plan includes a review of the school's core values and vision of the graduate. Goals in the school improvement plan include integrating health components, revising curriculum, and expanding student interventions. The elements of the plan came about through feedback from faculty, students, parents, and community stakeholders. Students have opportunities to provide input and feedback in order to improve the school through student government and school council, as well as through surveys, questionnaires, evaluations, and other formal and informal opportunities throughout the year. The school asks students to provide individual class evaluations as well as whole-school evaluations each year, providing critical feedback for improvement. Additionally, parents can attend parent support group meetings and serve on the parent council. These provide important opportunities for parents to help the school make improvements. In addition the Academy gets feedback from WPI primarily through the dean of undergraduate studies and from the Massachusetts legislature. Finally, the Academy has plans underway for a formally-structured alumni association. With multiple opportunities and venues for the Academy, not only to seek feedback, but also for stakeholders to provide feedback, the Academy is able to adapt and change based on a wide range of input.

Educators engage in ongoing reflection, formal and informal collaboration, and professional development to improve student learning and well-being. Teachers engage in collaboration and reflection during scheduled weekly faculty meetings. Due to the small size of the faculty, ongoing collaboration appears natural and continuous with teachers reflecting on how to best reach and engage students in learning. The STEM teacher reported collaborating with the humanities teacher on writing skills. Various cross-curricular activities throughout the year such as the Computer Science Apps for Good proposals, the engagement of all faculty members in advising students on their STEM projects, and the work at Seven Hills demonstrates a high level of cross-curricular faculty collaboration. Each teacher sets individual SMART goals as part of the evaluation system which include goals and plans for professional development. This then allows each teacher to identify areas of need for his or her own professional learning. For example, the physics teacher attended an AP physics institute last summer. Faculty are encouraged to set goals and to identify professional learning that will help them stay abreast of new developments in their fields. These might include taking graduate courses and participating in summer workshops or attending and presenting at professional conferences. The director also encourages teachers to visit other schools in order to see what peers are doing in the classroom. The school also employs a part-time professional developer who conducts workshops on instructional technology. When necessary, the director also organizes shared book discussions on educational topics that could serve the school and continue to galvanize practices aligned with the school's vision of the graduate.

Educators examine evidence of student learning and well-being to improve curriculum, instruction, assessment practices, and programs and services. The weekly faculty meetings are instrumental in providing time for teachers to reflect on student progress and needs. Their collegial discussions often center around students developing the habits of mind essential for personal growth and successful learning. The student success plan is one example of a change implemented after reflection on the needs of struggling students. The student success plan requires students to reflect on the obstacles they might be facing in achieving success at the Academy and setting targeted goals for changing their habits and behavior in order to see improvement. The faculty and director also explained a process which helps faculty advisors assist students in selecting WPI courses for their senior year. Some members of the faculty collected and organized grades that alumni students have received in past WPI courses by professor and course. When advising students, faculty now have access to this information

and can help juniors make informed decisions about which classes to take the following year. This process is one example of the many decisions made collectively and then implemented which improve the program as a whole. The NEASC survey indicates that 100 percent of the faculty agree that they evaluate their lessons and adjust their teaching accordingly and 100 percent of faculty encourage students to try new things. When asked if teachers use a variety of assessments, 100 percent of families agreed they did so while 85 percent of students felt their teachers used a variety of assessments.

Collaborative structures and processes support coordination and implementation of curriculum. The small size of the school and having one teacher for each content area are factors which help to facilitate collaborative structures and processes during 11th grade. Vertical alignment is particularly challenging as students come from a number of different sending schools, and the Academy provides curriculum for only the junior year. There is little vertical alignment with prior school years and a unique alignment with senior year courses taken at WPI. With impressive skill, teachers adapt to this reality by providing multiple levels of learning and challenge within their classrooms. For example, the computer science teacher had students working on three different challenge levels with a Java coding project. Also, the physics teacher provided students who come from varying levels of math experience to approach physics problems at their level. Numerous projects and learning experiences throughout the year highlight cross-curricular coordination. Physics and STEM coordinate their curriculum and projects for experimental design. Computer science and technical writing coordinate instruction and incorporate other disciplines such as humanities and art.

School-wide organizational practices are designed to meet the learning needs of each student. The range of student ability and their past academic experiences drive differentiation within each course area. For example, in math, where some students' highest level of knowledge might be Algebra II, Pre-Calculus, or AP Calculus, the project-based learning style provides opportunities for students to learn from each other by working together. This focus on differentiation was seen in each classroom visit. Teachers described the efforts made to differentiate projects to help each student excel. This was particularly evidence in physics, humanities, and foreign languages.

Educators develop productive student, family, community, business, and higher education partnerships that support learning. Parents attend a Parents Academy in the fall and attend classes in order to experience first-hand the project-based collaborative learning that their students are experiencing. Parents also meet with teacher in the fall for parent conferences during the first week of November. Using the narrative report cards that students receive, the meeting allows for an open dialogue with teachers and parents regarding the student's progress made thus far. The Academy also provides workshops in order to help seniors and their parents through the college-application process. The cornerstone of the Academy is the 26-year old partnership with Worcester Polytechnic Institute. This partnering of a public school and a private university has proven to be one of expanded opportunities for high school students and one which is valued and supported by the college as evidenced in technology support, access to campus facilities. The level of collaboration and communication that the Academy has with WPI was evident to the collaborative committee during the tour of the WPI campus. Clearly, the WPI campus is a welcoming and valuable place for both students and faculty of the Academy. The director spoke of his weekly contact with the undergraduate academic dean at the school. The Academy also maintains membership in the 90-member National Consortium of Secondary STEM Schools, an indication of partnerships with other institutions across the nation, and next year the director will serve as president of the NCSSS. The Academy also establishes critical partnerships with professionals working in STEM fields. The Academy's annual computer science week includes interviews with and presentations by experts in various technology fields. The annual STEM fair uses judges drawn from colleges, businesses, corporations, research facilities, and health fields. These partnerships provide valuable real-world connections to learning with individuals who likely help to shape a student's sense of possibility about their own futures. Finally, partnerships with community service organizations support learning. A student community service requirement of 100 hours encourages students to get involved with the community through hospitals, rehabilitation centers, food banks and shelters, schools and churches, and many other served-oriented institutions. For example, the school has a relationship with the Seven Hills Foundation, an organization which serves the needs of disabled and challenged students and adults. Using 3D printers, students have identified needs and then designed and produced solutions for those needs. Students produced solutions for people such as a special keyboard for an adult losing his vision and a special bowl which helps individuals suffering from swallowing impediments slow down their eating. One student at the senior lunch spoken passionately about her experience helping people through the

Seven Hills Foundation. She explained how this experience of seeking out problems to solve for those in need has changed the way she thinks about her world and her surroundings.

## **Sources of Evidence**

- classroom observations
- NEASC survey
- school leadership
- school support staff
- self-reflection
- students
- teacher interview
- teachers

# Standard 4 - Learning Support

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## Narrative

The school has timely, directed, and coordinated interventions for all students. The school provides targeted supports to meet each student's individual needs, including counseling services, health services, library/information services, and other appropriate support services to assist each student in meeting the school's vision of the graduate.

Students receive appropriate intervention strategies to support their academic, social, and emotional success. Faculty discuss specific concerns about individual students regarding their academic success, social interactions, and emotional well-being at a weekly faculty meeting with strategies initiated to bring about student success and growth. In addition, juniors in need of additional support meet with a faculty advisory and create a student success plan, identifying specific actions to enable success. Each senior student meets with a faculty advisor each week who monitors the student's progress, success, and well-being. In addition, the school provides events to orient students to the school, help them build relationships, and support habits for success. Some of these events include a half-day orientation session in May, orientation in August, a three-day retreat to Camp Bournedale in September, and workshops on time-management and collaboration. Students reported feeling that faculty members were always available to them and care about them. The faculty truly view students as individuals coming from unique situations who respond to different strategies depending upon the formative experiences, strengths, talents, and needs of each student.

The school has intervention strategies designed to support students. The Academy guidance counselor is the primary resource for facilitating and communicating accommodations for students with IEPs or 504s. Accommodations are implemented when necessary. The Academy uses a formal student success plan for juniors experiencing difficulties with academics, time management, and other issues. Interventions strategies for seniors include weekly advisory meetings, monitoring of mid-term progress submitted by WPI campus instructors to the Academy director. The faculty and staff spoke of doing everything possible to help students stay on track and meet expectations. They do not want to see students have to leave the school due to academic struggles. The NEASC survey reports that 79 percent of students know who to go to for help with social/emotional concerns and 88 percent of students feel their guidance counselor is available to them when they need help.

All students receive counseling services that meet their personal, social, emotional, academic, career, and college counseling needs from adequate, certified/licensed personnel. The Academy's guidance counselor provides professional services for each student's personal, social, emotional, academic, and career/college planning throughout junior and senior year. The guidance counselor meets with individual students on both a scheduled and as-needed basis, helping each student design an individualized plan for taking the SAT and ACT tests. During the fall of a student's senior year, the guidance counselor guides students through the college application process. This includes reviewing college application essays, writing letters of recommendation, and advising students and parents on scholarships and financial assistance. The school counselor works with students to help them deal with stress, family issues, and any other typical high school concern. For more severe issues such as concerns for mental health, the school counselor provides referrals to parents for outside providers both in the Worcester area and those closer to the student's home community. The school counselor communicates directly and frequently with parents when students are faced with challenges. Currently, the Academy has a full-time guidance counselor. Conversations are underway for the Academy to connect with a network of outside professional referral services. The school is looking at the potential need for additional support services to augment the work of the current counselor.

All students receive health services that ensure their physical and emotional well-being from adequate, certified/licensed personnel. The Academy has a licensed nurse on staff. The nurse's primary office is located on the WPI campus in close proximity to the Academy. Two mornings per week, she resides in a satellite office located within the Academy building. The nurse is available by phone and can come to the school as needed on days when she is at WPI. The nurse administers vision and hearing screenings to all juniors. As a result of this screening, the nurse refers students to an ophthalmologist or to an ear specialist if needed. The nurse reviews all

required physical and immunization forms to ensure all students meet these health standards. The nurse is in contact with parents and physicians to ensure proper follow-up on medical issues. The Academy's nurse facilitates training and presentations for faculty, staff, and students. The nurse provides workshops to students on issues such as drugs, stress, and the importance of getting enough sleep. All faculty and staff are first aid and CPR certified, as well as EpiPen trained. As discussed in an interview, the nurse is part of a newly-formed health and wellness committee which will seek to identify areas of need and provide further support to students.

All students receive library/information services that support their learning from adequate, certified/licensed personnel. Because of its unique relationship with WPI, all students from the Academy have full access to all of the library services at the WPI library. WPI's George C. Gordon library has a staff of 21 full-time professionals and 41 student employees. The library provides various services to Academy students including orientation at the beginning of junior year as well as online workshops and databases. In addition, a designated library research team member is onsite to help assist students with research each Wednesday and will visit the Academy more frequently when necessary. The STEM teacher reported that a WPI librarian had visited the class during the prior week in order to work with students on their research. This access to a college library resources including staff is an invaluable part of the experience for students as they develop research skills and college-level skills.

When enrolled, identified English Language Learners and students with special needs and 504 plans receive appropriate programs and services that support their learning from adequate, certified/licensed personnel. While the Academy does not currently have any identified English Language Learners, the guidance counselor identified services available through WPI for English Language Learners. Students with special needs and 504 plans receive appropriate accommodations and services and learning support from certified/licensed personnel. The director explained that most students who might have an IEP or 504 tend to have organizational, attentional, or behavioral issues requiring accommodations for the student. The guidance counselor assists teachers with compliance regarding students' needs.

## **Sources of Evidence**

- classroom observations
- parents
- school leadership
- self-reflection
- students
- teacher interview
- teachers

# Standard 5 - Learning Resources

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## Narrative

The Academy has a school facilities that support the delivery of a high-quality curriculum. The facility that contains classrooms, meeting spaces, offices, and other physical areas that are conducive to both traditional and non-traditional pedagogical approaches. The facility has been design to meet the specific vision and goals of the school. Classrooms are furnished with round tables instead of traditional desks; teachers have individual offices for advising students; the student library is a common area connecting the classrooms, and students use it to work together and to leave their materials while they attend class. There is a small but efficient 3D printing room, offices for the director, guidance counselor, and the nurse, a student kitchen area, and a faculty meeting room. In addition, there is a multipurpose space known as the brickyard where whole school meetings and lunch are held. The brickyard also functions as everything from a teleconference space to an ad hoc student instrumental recital area.

Students have full access to the resources of WPI's Gordon Library online, both at the Academy and while they are at home, and have physical access to the campus library building. Additional resources for students include the buildings and facilities located in the neighboring WPI Gateway Park Life Sciences and Bioengineering Center and other buildings on the main WPI campus, which is readily accessible via a free van shuttle service from the Academy. These buildings contain laboratory and research facilities for biology, chemistry, mechanical engineering, robotics, aerospace, and computer science, as well as housing tutoring programs for writing such as the writing center and the math and science help center (MASH). There are also fully-equipped classrooms and meeting space/work areas in the Gordon Library and other buildings throughout the campus. Students also make use of WPI's physical education facilities and as juniors have regularly scheduled physical education time led by a member of the WPI faculty. The range and breadth of resources include those for swimming, field sports, racquet sports, basketball, weight lifting, cardio exercise, yoga, and aerobics.

The facilities at the Academy are safe, secure, clean and well maintained. The front door is a secured and controlled by a vigilant and caring operations manager in the lobby area. The school is monitored and assisted by the WPI campus police and has regular evacuation drills to comply with local ordinances. There are clear guidelines in each area for evaluation and alternative route. Students have key-card access to the first foyer of the school and are monitored by the operations manager. There are direct lines and panic buttons to the WPI campus police at the front door, within the front foyer, and in multiple locations throughout the school itself. There are unified crisis response manuals throughout the school and protocols are printed in the student and faculty handbooks.

The Academy faculty benefit from weekly professional meetings to coordinate and discuss the students in their charge. The faculty are also encouraged by the director to visit other schools, both sending schools and other members of the National Consortium of Secondary Stem Schools (NCSS) and provides reimbursement to attend off-site workshops or conferences. Faculty have free access to WPI courses, programs, training, lectures, and presentations. Prescribed professional development includes training on CPR and first aid for all staff, as well as workshops in lab safety, library services, diversity, and technology. The schedule for the Academy generally allows all classes to meet each day for an hour, but is flexible to allow scheduling for other events including unique opportunities that arise. The weekly schedule is constructed well in advance in order to accommodate instructional needs and school priorities, with allowances for flexibility for last-minute changes as they are needed. Teachers make use of best practices as demonstrated by educational research, such as collaborative learning, modeling, project-based learning and assessment, and zone of proximal development. As juniors, students are brought to a three-day retreat off-site at Camp Bournedale in Plymouth, Massachusetts. This retreat serves the dual purpose of introducing the instruction on students' focused scientific research for the year, but moreover to further develop the expectations of students as a member of the Academy leading to the vision of the graduate.

MA Academy's funding stream is a unique legislative subsidy renewed on a yearly basis, not through Chapter 70, and keeping pace with rising expenses has been a challenge. While consistently supported by the legislature, the

Academy was level funded for several years, and was part of a small 9c cut twice in the last six years. A salary survey (in 2017) shows that Mass Academy teacher salaries were behind those of many neighboring districts, which raised concerns about retaining and recruiting highly qualified staff at such a specialized school. A budget request increase in FY 2018 was partially funded (\$100,000 out of a \$200,000 request) and was used to address the base salary issue and cost increases. The Director will request an additional \$100,000 increase for FY19, and will suggest language in the bill to formulaically increase the base budget of Mass Academy annually at the same percentage rate as the increase in Chapter 70 funding for public schools. The Director looks forward to the legislature's endorsement of this budget formula. During conversations with the Director, he commended the Massachusetts Legislature for its continuing support of the MA Academy and for valuing the outcomes which the Academy consistently delivers to provide excellence in STEM education for the students of the Commonwealth.

The Academy has short-term and long-term plans to address the capital and maintenance needs of its building and facilities. Some of the short-term plans rely on the support of the Parent Support Group. The Parent Support Group engages in fund-raising activities and projects throughout the school year. As equipment or facility improvement needs are identified by the school community each year, available funds are allocated accordingly. Capital fund-raising campaigns over the past several years have targeted, and succeeded in, the purchase of new student lockers, modular furniture for the library and classroom SMART boards, and additional microwave ovens. During the 2017-2018 school year, an end-of-the-year fund-raising appeal to parents, alumni, and friends of the Academy raised money to purchase a new projection and sound system for the brickyard.

Physical plant maintenance needs, such as routine cleaning services and HVAC maintenance are arranged in accordance with the provisions of the Academy lease and in conjunction with the available resources of the WPI facilities office. The carpet is professionally cleaned every summer. The need for any painting or other repairs/improvements/cleaning (e.g. carpet cleaning) is identified by the end of the school year, and work is scheduled and completed prior to the start of the next school year. Maintenance of computer equipment and network operations is handled on an ad hoc basis by the WPI IT services and support office. Maintenance of the card access security system is handled by the staff of the WPI Director of Public Safety at the WPI campus police department.

## **Sources of Evidence**

- central office personnel
- classroom observations
- community members
- facility tour
- NEASC survey
- parents
- school leadership
- self-reflection
- students
- teacher interview
- teachers

# Priority Areas

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## Priority Area

### PRIORITY AREA FOR GROWTH #1 SCHOOL INPUT

In the spring of 2018, the acknowledgement of a need for consistency in the design and formatting of the Academy's junior year curriculum documents, led to the establishment of curriculum-writing workshop sessions, with a focus on a modified "Understanding By Design" template. The faculty was tasked with initiating revisions of the curriculum over the 2018 summer break, with completion of the updated curriculum documents during the 2019-2020 academic year. The target date for submitting the completed curriculum is on or before May 31, 2020.

### VISITING TEAM RESPONSE

The visiting team supports the identification of consistency in design and formatting of the Academy's junior year curriculum as its top priority, and recognizes that the timeline has been carefully considered by the faculty and the leadership team as a realistic and important priority for growth.

## Priority Area

### PRIORITY AREA FOR GROWTH #2

The visiting team recommends a second priority area for growth.

While recognizing the existing excellence of interventions in place at the Academy as noted throughout the report, given all of the recent and emerging research regarding the academic, social, and emotional needs of students, the team recommends that the school continue to seek additional support services focused on the social and emotional well being of its students.

# Commendations

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## Commendation

The school's thoughtful care-taking of a safe, positive, respectful, and inclusive culture that maximizes and celebrates diversity in thought

The actualization of and unification through the school's allegiance to its core values, beliefs about learning, and carefully crafted vision of the graduate built on attainment of transferable skills, knowledge, understandings, and dispositions necessary for future success

The unwavering support received from the president and the Board of Trustees of WPI and her team as evidenced by the president's keen understanding of the mission and beliefs about learning that characterize and shape the Academy

The comprehensive and well designed Emergency Response Plan for MA Academy of Math and Sciences and the impressive associated familiarity with crisis protocols articulated by students and staff

## Commendation

The school-wide commitment to inquiry-based instruction informed by the research on best educational practice and demonstrated through impressive and consistent collaborative learning, innovation, and reflection

The school's highly effective and inclusive leadership which promotes intellectual risk taking, personal growth, and provides staff and student with opportunities to develop agency and to impact the continuous improvement of the school

## Commendation

The unanimous commitment by students to civic engagement in ways which give meaning and application to their emerging knowledge and skills

The array of opportunities provided for students to develop and demonstrate depth of understanding, lead their own learning, engage in problem-solving, and express mastery of higher order thinking skills in authentic ways

## Commendation

The willingness of faculty and staff to engage in ongoing reflection, formal and informal collaboration, and professional development to improve student learning and well-being

The high level of dedication demonstrated by the staff towards meeting the academic and extracurricular needs of all students through personalization and commitment to inquiry-based instruction designed to maximize the model of student as reflective learner.

The school's commitment to include individual and group meetings with all students specifically through multiple faculty advisory groups, school counseling services, and a high level of emotional and academic support and accessibility demonstrated by faculty

## **Commendation**

The school's exemplary success in developing, nurturing, and sustaining productive student, family, community, and higher education partnerships that support learning

The provision of school buildings and facilities through the successful 26 year partnership with WPI that support best practice delivery of instruction and cross-curricular curriculum

## **Commendation**

The development of productive relationships which engage families as partners in school improvement through demonstrated understanding of and ability to serve as ambassadors of the Academy's core values, beliefs, and newly crafted vision of the graduate

The unique and generous relationship with WPI specifically regarding student access to the university's library resources and staff including the provision of on-site support from WPI staff at the Academy

The instructional excellence demonstrated by the WPI faculty and its willingness to fully integrate Academy students in a myriad of ways including advice on research design, mentoring, and accessibility which enhance the mission of the Academy

## **Commendation**

The university's role in the provision and maintenance of school buildings and facilities that support the delivery of high quality curriculum programs and services including state of the art technology specific to the dynamic and safe learning environment created at 85 Prescott Street

The university's role in providing access to the wide array of facilities and opportunities for Academy seniors beyond their academic classes on the WPI campus including, but not limited to, physical education instruction, maker spaces, lab research, student union, function spaces, tech support, library, intramural and club activities.

## **Commendation**

The rapport and synergy developed by the WPI dean of undergraduate studies and the director of the Academy in their shared vision and pursuit for dependable funding to fully implement the curriculum including co-curricular programs and other learning opportunities as evidenced by the dean's presence in the Academy and the director's visits to the WPI campus

# Recommendations

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## Recommendation

Provide professional development both in training and dedicated time in accessing and using the modified Understanding by Design curriculum template as a tool to ensure consistency in the production of curriculum documents

## Recommendation

Provide time and resources for curriculum development to ensure that the curriculum is a living and fluid document reflecting emerging topics and best educational practice research

## Recommendation

Expand the role of the newly formed Health and Wellness committee to review specific and sequential responses for students at risk in areas of academic, social, emotional, and personal health concerns

## Recommendation

Ensure student have sufficient support services to meet there needs, especially focused on social and emotional well-being

# **FOLLOW-UP RESPONSIBILITIES**

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This Collaborative Conference visit report reflects the findings of the school's Self-Reflection and those of the visiting team. It provides a blueprint for the faculty, administrators, and other officials to use to improve the quality of programs and services for the students in this school. The faculty, school board, and superintendent should be apprised by the building administrators yearly of progress made in addressing visiting team recommendations.

A school's initial/continued accreditation is based on satisfactory progress implementing valid recommendations of the visiting team and others identified by the Commission as it monitors the school's progress and changes which occur at the school throughout the decennial cycle. To monitor the school's progress in the Follow-Up Program, the Commission requires that the principal submit routine Three- and Six-Year Progress Reports documenting the current status of all report recommendations, with particular detail provided for any recommendation which may have been rejected or those items on which no action has been taken. In addition, responses must be detailed on all recommendations highlighted by the Commission in its notification letters to the school. School officials are expected to have completed or be in the final stages of completion of all valid visiting team recommendations by the time the Six-Year Progress Report is submitted. The Commission may request additional Special Progress Reports if one or more of the Standards are not being met in a satisfactory manner or if additional information is needed on matters relating to Decennial Accreditation report recommendations or substantive changes in the school.

To ensure that it has current information about the school, the Commission has an established Policy on Substantive Change requiring that principals of member schools report to the Commission within sixty days (60) of occurrence any substantive change which negatively impacts the school's alignment to the Commission's Standards for Accreditation. The report of substantive change must describe the change itself and detail any impact which the change has had on the school's ability to meet the Standards for Accreditation. The Commission's Substantive Change Policy is included on the next page. All other substantive changes should be included in the Three- and Six-Year Progress Reports and/or the Annual Information Report (AIR) which is required of each member school to ensure that the Commission office has current statistical data on the school.

The Commission urges school officials to use the results of the Collaborative Conference Report as well as the school's identified priority areas for growth to draft a school growth and improvement plan, and to review and implement the findings of the Self-Reflection and valid recommendations identified in the Collaborative Conference report. An outline of the Follow-Up Program is available in the Commission's Accreditation Handbook, which is available on the Commission's website.

The visiting team would like to express thanks to the community for the hospitality and welcome. The school community completed a Self-Reflection that clearly identified the school's strengths and areas of need. The time and effort dedicated to the Self-Reflection and preparation for the visit ensured a successful Collaborative Conference visit.

# **SUBSTANTIVE CHANGE POLICY**

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## **NEW ENGLAND ASSOCIATION OF SCHOOLS & COLLEGES Commission on Public Schools**

Principals of member schools must report to the Commission within sixty (60) days of occurrence any substantive change in the school which has a negative impact on the school's ability to meet any of the Commission's Standards for Accreditation. The report of a substantive change must describe the change itself as well as detail the impact on the school's ability to meet the Standards. The following are potential areas where there might be negative substantive changes which must be reported:

- elimination of fine arts, practical arts, and student activities
- diminished upkeep and maintenance of facilities
- significantly decreased funding - cuts in the level of administrative and supervisory staffing
- cuts in the number of teachers and/or guidance counselors
- grade level responsibilities of the principal
- cuts in the number of support staff
- decreases in student services
- cuts in the educational media staffing
- increases in student enrollment that cannot be accommodated
- takeover by the state
- inordinate user fees
- changes in the student population that warrant program or staffing modification(s) that cannot be accommodated, e.g., the number of special needs students or vocational students or students with limited English proficiency

# Roster of Team Members

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## Chair(s)

**Chair: Dr. Ellin Booras** - New England Association of Schools & Colleges

## Team Members

**Matthew Corcoran** - Framingham High School

**Julie Gutierrez** - Killingly High School