



**Department of
Education**
Carmen Fariña, Chancellor

Office of School Quality
Division of Teaching and Learning

Quality Review Report

2014-2015

**High School for Mathematics, Science and
Engineering at City College**

05M692

**240 Convent Ave.
Manhattan
NY 10031**

Principal: Crystal Bonds

**Date of review: January 8, 2015
Lead Reviewer: Rod Bowen**

The School Context

High School for Mathematics, Science and Engineering (HSMSE) has 456 students from grade 9 through grade 12. The school population comprises 9% Black, 24% Hispanic, 25% White, 37% Asian students, and 5% other. The student body includes 3% special education students. Boys account for 67% of the students enrolled and girls account for 33%. The average attendance rate for the school year 2013-2014 was 94.3%.

School Quality Criteria

Instructional Core		
<i>To what extent does the school...</i>	Area of:	Rating:
1.1 Ensure engaging, rigorous, and coherent curricula in all subjects, accessible for a variety of learners and aligned to Common Core Learning Standards and/or content standards	Additional Findings	Well Developed
1.2 Develop teacher pedagogy from a coherent set of beliefs about how students learn best that is informed by the instructional shifts and Danielson Framework for Teaching, aligned to the curricula, engaging, and meets the needs of all learners so that all students produce meaningful work products	Additional Findings	Well Developed
2.2 Align assessments to curricula, use on-going assessment and grading practices, and analyze information on student learning outcomes to adjust instructional decisions at the team and classroom levels	Focus	Well Developed
School Culture		
<i>To what extent does the school...</i>	Area of:	Rating:
3.4 Establish a culture for learning that communicates high expectations to staff, students, and families, and provide supports to achieve those expectations	Celebration	Well Developed
Systems for Improvement		
<i>To what extent does the school...</i>	Area of:	Rating:
4.2 Engage in structured professional collaborations on teams using an inquiry approach that promotes shared leadership and focuses on improved student learning	Additional Findings	Well Developed

Area of Celebration

Quality Indicator:	3.4 High Expectations	Rating:	Well Developed
---------------------------	------------------------------	----------------	-----------------------

Findings

School leaders consistently communicate high expectations to the entire staff. All staff systematically communicates high expectations to all students.

Impact

The professional community exists within a culture of mutual accountability and ownership of high expectations. Students own their educational experience and are prepared for the next level.

Supporting Evidence

- The principal communicates high expectations to her staff via numerous methods, including but not limited to: beginning and middle of the year all faculty meetings, weekly professional development sessions, department meetings and the faculty handbook. Specific Danielson aligned expectations include embedding reading and research across the curricula. Teachers have embraced these expectations and brought them to fruition. For example, teachers have held themselves accountable for the development of a four year research sequence. Currently in its second year of implementation, 9th and 10th grade students are required to engage in research projects. A sophomore student stated that the most challenging and fun task he has had to do since he has been in the school was the research paper that he completed for his architecture course. In addition, all courses have adopted texts that are thematically connected to the content being taught. For example, the Integrated Algebra/Trigonometry class reads *Freakonomics* and the chemistry class reads, *Uncle Tungsten*.
- Students noted that Engrade, the school's online grading and student information sharing system, is invaluable in their ability to stay abreast of their overall progress. When asked how frequently their teachers update Engrade, they unanimously stated, "Daily". Some teachers post class participation feedback, which students claimed is great because it lets them know how well they did in a discussion, and not just on their assignments.
- A Freshman Academy was established to provide yearlong emotional and academic skill support to 9th graders who are acclimating to the rigorous learning environment. The school attributes Freshman Academy with the dramatic drop in the number of 9th graders that fail a course. The number went from over 60 three years ago to 10 last year. In addition, grade-specific partnerships with outside organizations and businesses inform the Advisory curricula and instruction. For example, the organization Pencil works with the 11th grade advisory. A junior stated that they have learned communication and networking skills, as well as how to write resumes.
- At the end of sophomore year, students have to select between, math, science or engineering for a focus of their second two years at HSMSE. Many of the teachers are former professionals in the fields that inform their courses, specifically in architecture and engineering. Real world experiences are integral to these discipline-centric programming. For example, students in the biomedical track, do research at Mt. Sinai hospital, and architecture students submit designs to professional level competitions.
- 99% of the 2014 senior class graduated and were accepted to four-year colleges and universities.

Area of Focus

Quality Indicator:

2.2 Assessment

Rating:

Well Developed

Findings

Across the vast majority of classrooms assessment practices ensure that actionable and meaningful feedback regarding student mastery is generated, and that student self-assessment, peer assessment and ongoing checks for understanding are in place. However, teacher originated feedback was more prevalent than student-cultivated feedback.

Impact

Though all student learning needs are met, as students are well aware of their next steps toward improvement and teachers make effective instructional adjustments, student self- and peer assessment are not maximized for self-sufficiency.

Supporting Evidence

- Ongoing checks for understanding were built into the discussions that took place across the vast majority of classes. For example, in an economics class the teacher asked the class a question tied directly to the AIM: How does the Federal Reserve steer the economy using monetary policy? The question was, "What might the Fed do to address unemployment?" A student answered. The teacher responded with, "Your response is correct, but can the fed do it?" He then invited another student to support the peer's misunderstanding.
- In discussing work with students, one stated that the teacher provided the class with the rubric before beginning the task. He thought he had not met all of the criteria, but upon getting feedback realized that his counter argument did not effectively oppose his original argument. Another student received clarity from a teacher that though he was making good points in a writing assignment, some of them were repetitive.
- Curricula-aligned rubrics and assessments are used across the vast majority of classrooms. Rubrics are used to assess not only Common Core aligned academic skills, but also discreet skills that fall outside of the four traditional academic content areas. For example, an architecture course uses a Universal Design Features rubric that contains the following criterion for a well-executed project: All required universal design features shown and annotated including: accessible entrance; door and passage width; open kitchen; and accessible bath. In addition, some rooms displayed rubrics for general student skills, such as studying for exams and participation in class. A striving level criterion for participation is: Actively participate by asking/answering questions and adding a point for discussion.
- When asked, "Where does the majority of the feedback you receive come from?", all students said their teachers. They also noted that they would appreciate more opportunities to review and correct their own work, or a peer's work. To explain, a student stated, "I like when I get feedback from a peer because usually it's more concise and to the point."

Additional Findings

Quality Indicator:

1.2 Pedagogy

Rating:

Well Developed

Findings

The belief that students learn best when they are accountable to each other through high levels of discussion, debate and/or presentation was evident across the vast majority of classrooms.

Impact

The school's commitment to student-to-student discussion, as well as other work products, reflects high levels of thinking, application of content, participation and ownership on the part of students.

Supporting Evidence

- In a math class, small groups took turns presenting their process of solving assigned math problems. The groups were given the freedom to decide the best manner in which to present their work. The teacher and other students asked the presenting group questions regarding their work. When asked why a shell would be most optimal in representing the math problem, a presenting student noted that the shape produced "mimicked the concavity of the equation."
- Pairs of students in an architecture class engaged in a brainstorming activity designed to yield ideas for building residences for people of varying ages and physical ability. Students were overheard discussing such considerations as: parental privacy, child safety and innovative uses of technology.
- An English class began with a Do Now that asked students to reflect on a moment when they felt a heightened moment of awareness. Students shared their responses. One mentioned instances when people share their impressions of him. Another talked about having a heightened awareness of her privilege when visiting certain countries outside of the United States. Before leaving the classroom, students began transitioning into learning groups where they were to analyze various texts from philosophers and prepare for presentations of their analysis.
- Students in a social studies class were engaged in a Socratic Seminar. They had to form an opinion based on the writings of Marcus Aurelius. Students quoted the text as they shared their interpretations and responses to Aurelius' various philosophies. One student asserted, "I found it interesting that he said death was a natural part of life." He then went on to discuss the benefits of such an outlook. Students were observed agreeing and disagreeing with each other and backing their perspectives up with evidence from the text. The teacher encouraged students to rebut and at one point directed a student who had just spoke to select a peer to go next who did not have their hand up to volunteer.
- School leadership shared a Danielson Framework aligned document used for training and accountability entitled: *Using Questioning and Discussion Techniques – Directives for Implementation*. Use of wait time, calling on non-volunteers and redirecting student questions to other students are just some of the strategies outlined as professional expectations that were observed in the classrooms.

Quality Indicator:	1.1 Curriculum	Rating:	Well Developed
---------------------------	-----------------------	----------------	-----------------------

Findings

Common Core Learning Standards aligned curricula strategically integrate instructional shifts across grades and subject areas. Rigorous habits and higher order skills are coherently emphasized across the school's curricula and academic tasks.

Impact

All students have access to rigorous curricula and academic tasks that promote higher order thinking as well as college and career readiness.

Supporting Evidence

- Lesson plans from AP English Literature and Composition, Economics, Advanced Architecture and Chemistry all contained tasks that require students to analyze informational text, referencing English language arts (ELA) instructional shifts 1: balancing informational and literary text, and 4: text-based answers. Annotation was seen across numerous documents as a means for text analysis and increased reading comprehension.
- The vast majority of planning documents evidenced a coherent expectation that students meet Common Core Speaking and Listening Standards such as: responding thoughtfully to diverse perspectives, summarize points of agreement and disagreement; and initiate and participate effectively in a range of collaborative discussions.
- Curricular documents clearly outlined how instruction is informed by Common Core, content and/or industry standards. Such standards include: offer alternatives for visual representation and interpret the structure of expression.
- Rigorous tasks that promoted higher order thinking across grades and subject areas included examples, such as analyze the meaning of "heightened consciousness" in the existential sense in an 11th grade English language arts class; analyze economic scenarios and develop a monetary policy response in a 12th grade economics class; and persuade others that your assigned classical civilization was more or less significant than theirs in a 9th grade World History class.

Quality Indicator:	4.2 Teacher teams and leadership development	Rating:	Well Developed
---------------------------	---	----------------	-----------------------

Findings

The vast majority of teachers engage in inquiry-based work.

Impact

Instructional coherence, strengthened instructional practice and increased student achievement for all learners were evident throughout the school. Teachers play an invaluable role in making decisions that affect student learning across the school.

Supporting Evidence

- Course-specific teacher teams meet at various times over the course of a week to ensure coherence through focusing on vertical alignment, Common Core skill integration and shared instructional strategies.
- The ELA team noted their investment in collaborating across grades in addressing student writing. Rubrics are used to determine levels of proficiency. This year's baseline data revealed that 9th grade writing showed patterns of merely presenting information as opposed to forming arguments. 10th grade writers needed support in breaking down writing prompts to know what was being asked of them. Juniors needed support in scaffolding their pre-writing process to ensure that their work was clear and detailed. The team's collective effort resulted in the strategic use of graphic organizers and model papers. Student work samples showed clear improvement in these areas. For example, 9th grade writing showed the ability to formulate arguments that can be substantiated with evidence from the text. They have now moved toward identifying counter-arguments. In the 2013-2014 school year, this collaborative practice of the ELA team resulted in an average proficiency level increase of 1.77 in targeted Common Core writing traits.
- The calculus team is empowered by the principal to use student data to design ability-based programming as well as curricular scope and sequence for higher level math courses. Mid-year data analysis shows that the average test scores per class were: 56%, 64%, 67%, 64% and 74%. These scores all fall within the Level 3 passing score range for the AP test as well as a credit-bearing score.
- A social studies teacher with the support of colleagues developed the school-wide curricular planning scope and sequence framework that all teachers currently use.
- Within the last two years, teachers have developed more rigorous, advance placement (AP) coursework including: AP Computer Science, AP Calculus AB and AP Environmental Science.