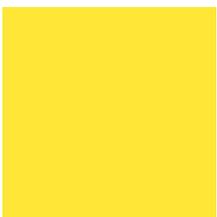
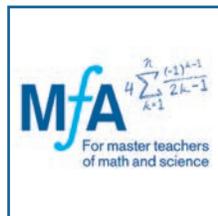
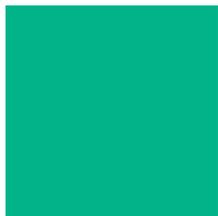
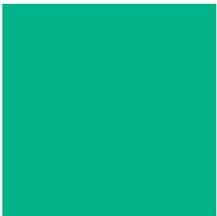
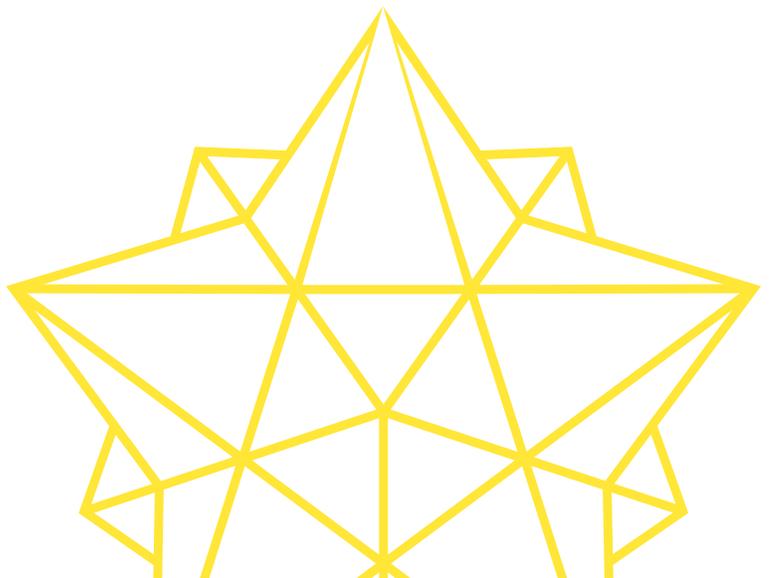
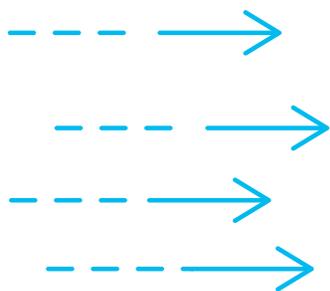


MfA Reflections

2017-2018





Foreword

For many years, *MfA* gathered data and assessed its program in a succession of ad hoc studies on a variety of topics, such as feedback from principals or Regents test scores. We often gained information about *MfA* at a particular moment, but as the program grew and changed the insight quickly became outdated.

Last year, for the first time, we created a report—*MfA Reflections*—that was meant to summarize some of the most important data. While the report was modest in scope, it was supposed to be the first in a series of annual reports that would be organized consistently into five key areas:

- Teacher Retention
- Teacher Efficacy
- Teacher-to-teacher Learning and Leading
- School Impact
- Spotlight on Special Activities

The sequence of reports would provide a record of *MfA* and its effects, both on teachers and their schools, and would become both a powerful assessment as well as a coherent narrative documenting *MfA*'s evolution.

This is the second of those reflections.

The organization of these annual reports reflects our goals:

- To keep the most accomplished math and science teachers in the classroom
- To foster professional growth for our teachers
- To provide opportunities for leadership, expanding *MfA*'s reach
- To change the teaching profession itself, making it more rewarding and exciting

This is an ideal time for such an effort. Now that *MfA* has stabilized in size, it has set out to improve all parts of its program and extend its reach beyond the *MfA* teachers themselves. In the future, we will gauge success not by size but by things that are harder to measure, like efficacy and impact. A collection of reports can effectively document these things over time.

We often say that teachers are the heart of our program. In a very real way, *MfA*'s accomplishments are reflections of our teachers' accomplishments.

These annual reports will provide a portrait of our teachers, their community, and their success.



John Ewing, President
Megan Roberts, Executive Director
Courtney Allison, Deputy Executive Director

Jennifer Hanrahan, Director of Research
Sarah Rooney, Director of Communications and Marketing
Dennis John, Contributor

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I. Teacher Retention

One of MfA's overarching goals is to keep the best math and science teachers in the classroom. To that end, we have a regular cycle of review and analysis to track our fellowship withdrawal and completion rates year-to-year and across the length of each four-year fellowship. We try to understand the reasons teachers withdraw from their fellowships as well as their future professional plans. The sections below discuss our most up-to-date data on fellowship retention in more detail.

Fellowship Retention

At the start of the 2017-18 school year, there were 974 teachers active in an MfA fellowship – 156 MfA Early Career Teachers and 818 MfA Master Teachers – representing four separate incoming cohorts.

Overall, across both fellowship types and all active cohorts, five percent of the teachers who were active in their fellowships as of the start of the 2017-18 school year withdrew before the start of the 2018-19 school year. Not all of these teachers left the classroom, however, and 31 percent moved to a teaching role outside of the NYC public school system. This means that the attrition rate from teaching in 2017-18 was about 3.5 percent.

Fellowship Retention 2017-18

95%

Fellowship retention rate from
Oct 1, 2017 to Sep 30, 2018

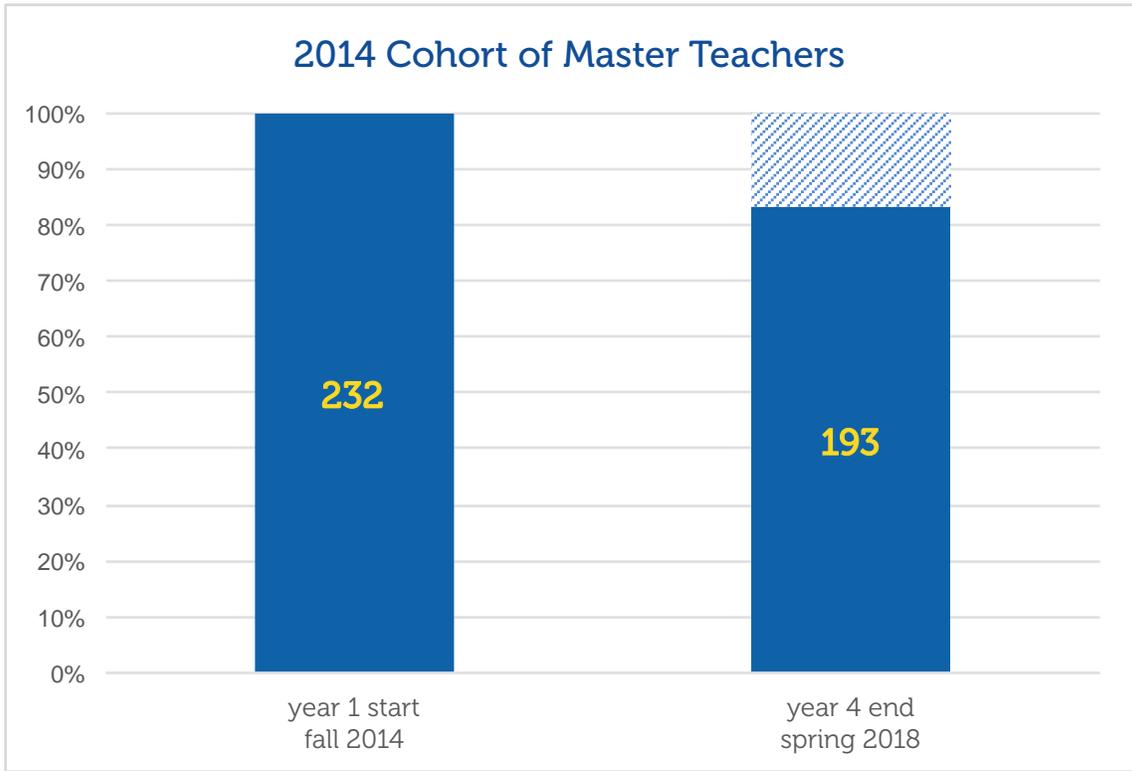
Teaching Experience

11 years

median years of teaching
experience among all Master
Teachers in MfA during the
2017-18 school year

Tracking the 2014 Cohort

The retention rate above is a one-year retention rate. What do retention rates look like if we track one cohort of teachers across multiple years? Here, a cohort refers to a group of teachers who applied to and were awarded fellowships in the same year. Tracking retention on a cohort basis, across all four years of the fellowship, can help us understand multi-year trends in retention more clearly than one-year retention rates, which are based on a snapshot of teachers from many different cohorts.

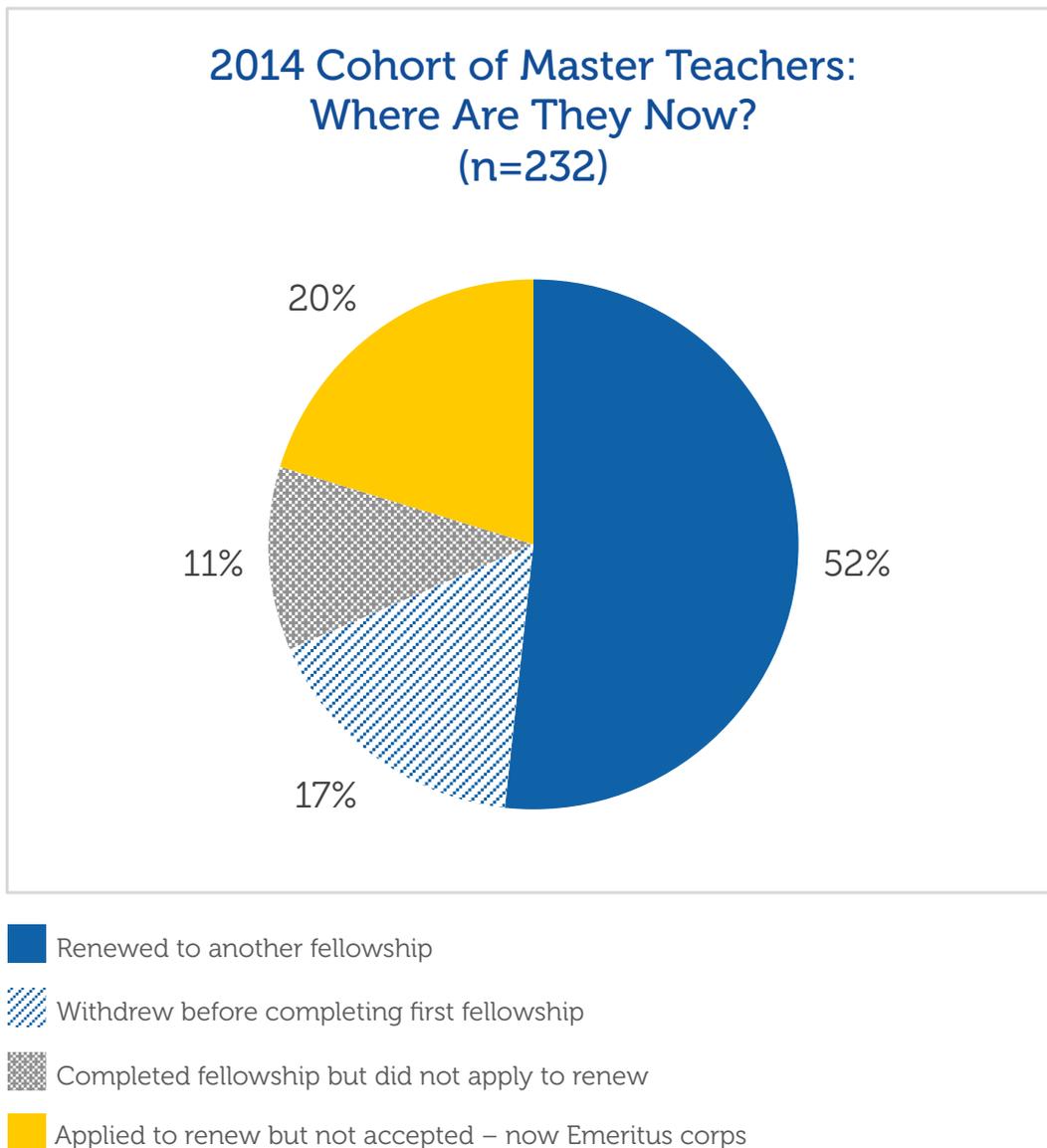


-  Active in fellowship
-  Withdrew from fellowship

232 MfA Master Teachers were awarded four-year fellowships that began at the start of the 2014-15 school year. 193 of these teachers, or 83 percent, completed the four-year fellowship. In other words, **83 percent were still teaching STEM in NYC public schools four years later**. As mentioned above, not all of the teachers who withdrew before completing the fellowship left the teaching profession. 44 percent of the 2014 cohort of MfA Master Teachers who withdrew continued teaching outside of the NYC public school system the following year.

MfA Master Teachers who complete a four-year fellowship can also apply to renew their fellowships for another four years. 87 percent of the 193 MfA Master Teachers who completed their fellowships in the spring of 2018 applied for renewal into another four-year fellowship cycle beginning in the 2018-19 school year, and 72 percent of these applicants were granted renewal (120 teachers). It is worth noting that renewal fellowships are awarded to teachers using a different set of selection criteria from the original fellowship.

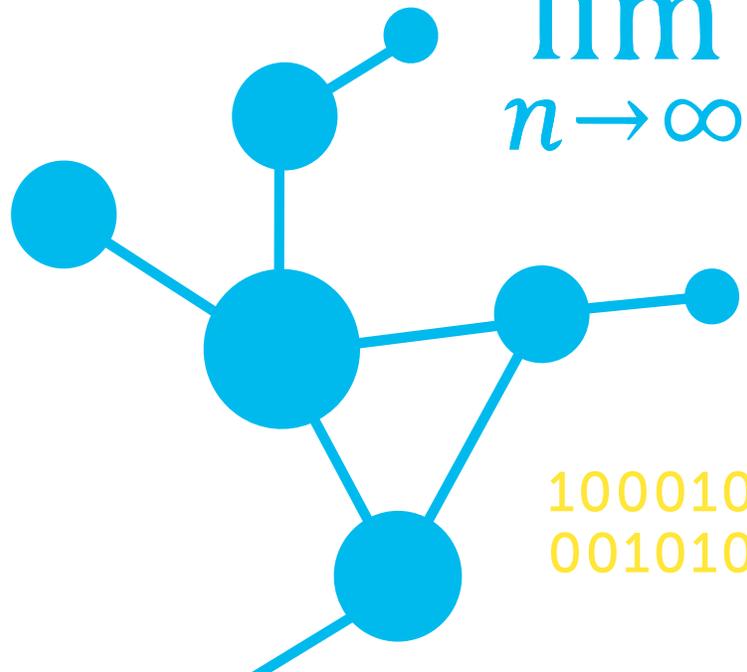
I. Teacher Retention



MfA Master Teacher Emeritus Corps

Teachers who complete an MfA Master Teacher Fellowship and choose not to apply for, or are not awarded, a renewal Master Teacher Fellowship, can still stay involved with the MfA community as Master Teacher Emeriti, as long as they continue to teach in some capacity. As more and more cohorts complete their fellowships, the size of our Emeritus

corps continues to grow. As an example, 35 of the teachers from the 2014 cohort who did not receive a renewal fellowship joined the Emeritus corps and continued teaching STEM in the 2018-19 school year. You can learn more about MfA's Emeritus corps [here](#).


$$\lim_{n \rightarrow \infty} \left(1 + \frac{1}{n} \right)^n$$

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II. Teacher Efficacy

In addition to our goal of keeping great teachers in the classroom, we also aspire to have a positive impact on their professional lives. Our programming aims to provide rigorous opportunities for MfA teachers to both learn and lead in an advanced, highly professional, and trusting environment. It is well documented that teachers leave the classroom at alarming rates because teaching is not considered “professional.” It is our aim to increase the professional efficacy of our teachers, both for them as individuals, as well as for the other teachers they support. We know from research that increased teacher efficacy leads to increased professional retention.

In the spring of 2018, we held several focus groups with MfA Master Teachers in the final year of their fellowships to better understand how their fellowships had impacted their professional lives. We asked these teachers to reflect on and share the different ways the MfA community has influenced them professionally and shaped who they are as teachers. Each focus

group consisted of a small group of teachers and was two hours in duration. We used an open-ended questioning protocol and recorded each of the sessions, allowing us to analyze, code, and group the feedback into key themes.

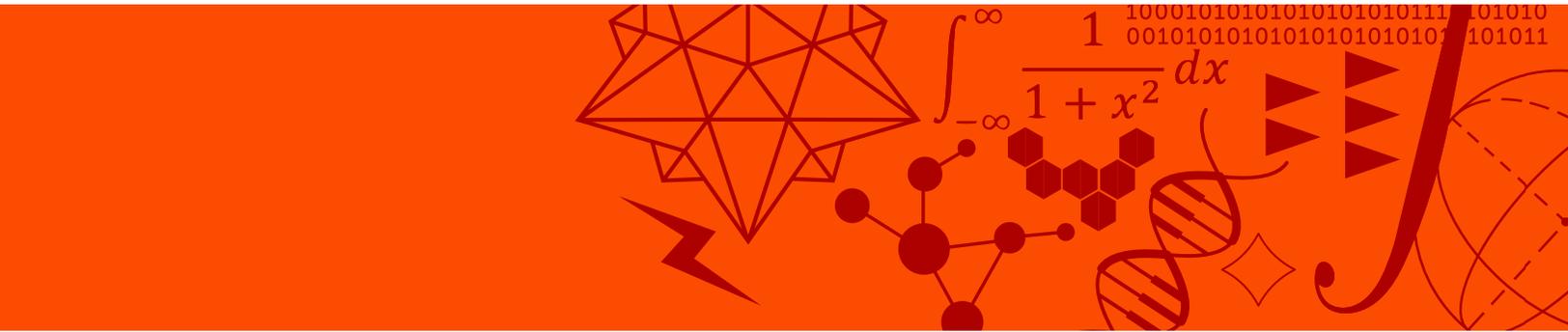
Four main themes related to teacher efficacy emerged from these focus groups:

(1) The self-directed learning aspect of the MfA fellowship model, where teachers define their own professional development priorities and are given the autonomy to pursue them, maximizes their professional growth.

Teachers reported that a common challenge for professional learning is finding a balance between continuing their own intellectual development in their subject area(s) while also exploring innovative strategies to improve student learning. The freedom to pursue their own professional learning goals at

Focus Group Questions

- *What have you gained from your MfA fellowship that has been the most instrumental in helping you achieve your professional goals?*
- *What was it like for you to adapt some of your learnings at MfA to your school? How did you communicate your experiences to your school colleagues and administrators?*
- *What is the most memorable or impactful experience you’ve had at MfA?*
- *What were some of the primary learnings in your collaboration with others? How did these experiences enable you to be what you wanted to be as a professional?*



MfA helps strike that balance. Teachers' insights often highlighted that past professional development experiences outside of MfA were more prescribed. Many teachers cited that they felt they took a passive role as "recipients" of professional development. In contrast, the self-directed learning available within the broad and diverse peer community at MfA enables them to own their professional growth.



"I look at [MfA's professional development] catalog first with the courses I'm teaching in mind and think about what could apply to them, but I always appreciate the idea that it's okay to just take a

course simply for myself as a scientist, to push my own thinking."

– MfA Master Teacher, High School

(2) Within their fellowships, teachers have the freedom to be both a novice and an expert, which supports authentic professional growth.

Teachers shared that the structure of the MfA fellowship and the culture and values of the MfA peer community give them the freedom both to, at times, be the novice in the room, learning from others (including fellow teachers and outside experts) and to be the expert in the room, facilitating and leading the learning of their peers. As teachers improve their practice through learning, sharing ideas, and facilitating other teachers' learning within the MfA community, they report that they gain confidence not just in their efficacy as teachers, but in their efficacy as leaders – within MfA, within their schools, and within the profession as a whole.

For many MfA teachers, this increased confidence has translated into taking more active roles in shaping

the learning of their peers within their schools and presenting new ideas to school administrators. During focus group interviews, teachers expressed feeling empowered to bring their learnings back to their schools, and many also said that they shifted from being "a classroom teacher to a school teacher." This ability to connect professional contexts reveals that the MfA experience extends beyond self-improvement.



"I think my fellowship at MfA has helped me feel like I can be a mentor to other teachers at my school

because I have all of these resources and people that are teaching the same content that I am...with MfA I feel very encouraged to take on a leadership role and that has actually

dominoed at my school."

– MfA Master Teacher, Middle School

(3) Soliciting input from teachers across the community regarding the range of professional development opportunities offered each year ensures the fellowship stays relevant and responsive to their needs.

During focus group interviews, MfA teachers frequently pointed to the value of participating in a collaborative learning environment characterized by an open exchange of ideas, where courses, interest groups, and social activities are initiated, designed and facilitated by teachers within the community.

The evolving course catalog at MfA represents input from hundreds of individual MfA teachers who come up with ideas for supporting the ongoing professional learning of the MfA community – creating an organic system of interconnected courses and workshops that originate from teachers' stated interests and needs. MfA teachers cite that the catalog-building aspect of

II. Teacher Efficacy

the fellowship model supports them in (1) fulfilling their own professional learning goals in a self-directed way and (2) sharing their expertise to solve challenges faced by their colleagues working in other school settings.

"MfA empowers teachers through teacher-led professional development. There's an emphasis on teachers being the best teachers of other teachers."

– MfA Master Teacher, High School

"I think we have this common language. It's not just the common language of math and science. I think this is the language that is being open for learning."

– MfA Master Teacher, High School

(4) MfA's fellowship community creates a low-stakes, safe place to fail, which encourages teachers to step outside of their comfort zones.

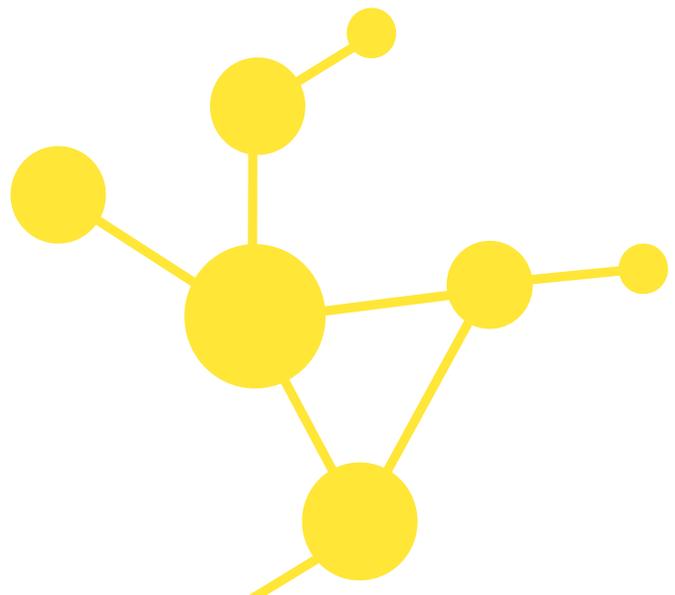
Teachers highlighted the importance of the support, encouragement and validation they receive from MfA

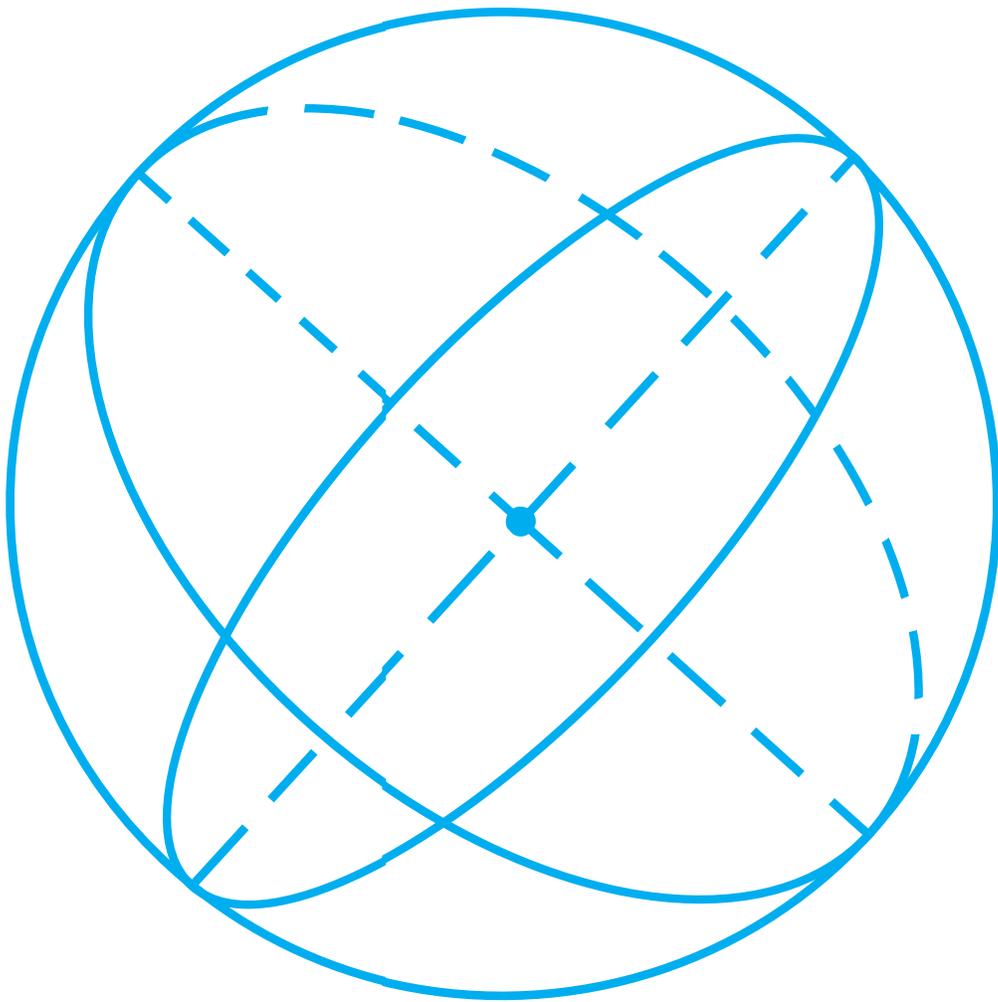
peers to step outside their comfort zones and lead the learning of other teachers – through, for example, teaching a course to other MfA teachers, or presenting at a conference. Teachers noted that while leadership opportunities exist in their school settings, too, these opportunities aren't always complemented with mentorship, support, or opportunities for reflection and feedback, such as exist within the MfA peer community.

Opportunities to lead professional development courses in particular seemed to support a shift in teachers' self-perceptions and increased confidence in themselves as content and pedagogical experts, and leaders in the profession.

"There are all these opportunities at MfA that I didn't envision myself even trying before. There's a moment when you see all of these science teachers and there's this feeling: maybe I can do that. And I think that I would have never considered those kinds of opportunities without MfA."

– MfA Master Teacher, Middle School





III. Teacher-to-Teacher Learning & Leadership

Teacher-led professional development at MfA

The majority of the professional development courses and community building activities available at MfA are conceptualized, designed, and led by teachers in MfA. About 70 percent of the credit-bearing professional development courses offered at MfA in the 2017-18 school year were facilitated or co-facilitated by MfA teachers. 225 Master Teachers, 94 Renewed Master Teachers and 45 Early Career Teachers facilitated courses last year – and 99 of these teachers were facilitating a course at MfA for the first time.

Teacher-led
workshops

70%

of professional development
workshops were led by MfA
teachers in 2017-18

17 computer science teachers facilitated professional development courses for their peers during the 2017-18 school year on topics ranging from using Bootstrap Algebra to design video games to coding with Python in the classroom.

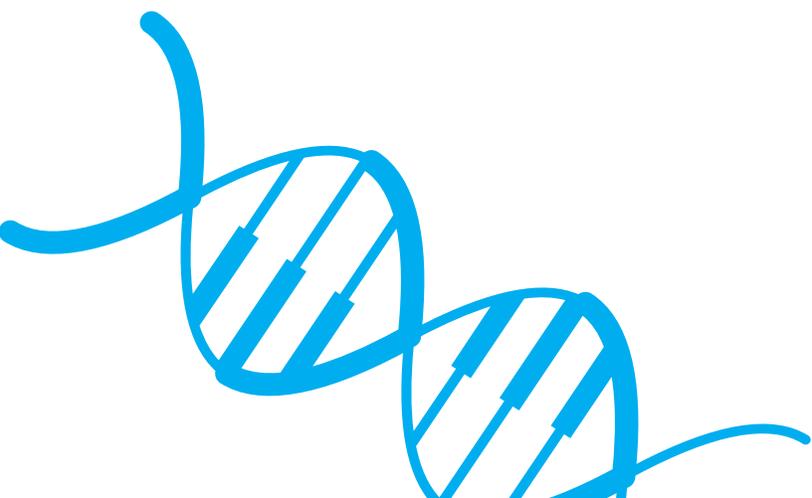
In the 2017-18 Spring Reflection Survey, we asked the teachers in our community (n=982) to reflect on all of their professional development experiences over the year and select three that were most meaningful to their work as a teacher. **Over 100 teachers selected a course they had led at MfA as among the most meaningful professional development experiences of the year**, connecting the experience to a strengthened sense of engagement and belonging

in the MfA community, increased confidence and leadership skills, and increased ability to influence their colleagues, their wider school community, and the profession as a whole. At the same time, teachers reported that they still gained the benefits of being a participant in the course, such as getting new ideas and feedback from peers, building trust and connections, and seeing topics from another's point of view.



Over the past year, we expanded opportunities for teachers by offering leadership roles as part of the fellowship – both within MfA and in the public forum. A notable example of this are the Renewed Master Teachers, who, in addition to their courses, also completed Community Contributions and were selected to give talks and presentations.

Community Contributions: Renewed Master Teachers	
Praxis Warm-Up Facilitator	Facilitator for MfA Early Career Teacher Cohort Meetings
Design Your Own Project	School Intervisitation Group
Research Department Advisory Group	Mentor for MfA Early Career Teachers
Social Media Influencer	Small-World Network Mobilizer
Fall Function Advisory Group	Summer Think Planning Committee



III. Teacher-to-Teacher Learning & Leadership

Course offerings in the 2017-18 school year

In the 2017-18 school year, we offered nearly 300 credit-bearing courses and a variety of non-credit bearing activities and opportunities to engage. It is worth noting that the number of Community Contributions (leadership opportunities for Renewed Master Teachers) increased this year over last, given the increased number of MfA Master Teachers in their second fellowships. We also expanded the

number of Interest Groups offered this past year, and decreased the number of Chancellor’s Day Workshops. This is because we have seen that Chancellor’s Day Workshops generally have low attendance, and teachers cite that this is because their schools are hosting internal professional development and/or important staff meetings on those days.

Credit-bearing courses:	#
Professional Learning Teams (PLTs) are a series of four connected workshops that meet over the course of the semester and consist of small teams of teachers who come together over a sustained period of time to deeply explore problems of practice. Participants bring attention, focus, and a willingness to move beyond sharing lessons and ideas to critically examine student work, research, and classroom practice.	86
Mini-Courses are a series of three to four connected workshops where experts from outside academic institutions and from the MfA Master Teacher community engage MfA teachers at the cutting edge of their content area and/or pedagogical practice.	92
Extended Length Courses are a series of six to eight connected workshops that meet throughout a semester or school year. Experts from outside academic institutions and from the MfA Master Teacher community engage MfA teachers at the cutting edge of their content area and/or pedagogical practice.	9
Single Session Workshops are one-time workshops where experts from the MfA Master Teacher community as well as outside academic institutions engage MfA teachers at the cutting edge of their content area and/or pedagogical practice.	96
Cohort Meetings are monthly workshops for Early Career and Elementary School Teachers, designed to provide opportunities for teachers to lead, collaborate, learn, share and reflect with their peers.	15
Total # of Courses:	298

Non-credit bearing activities:	#
Interest Groups are meetings during which small groups of teachers gather informally around a common interest. They provide opportunities to make connections and begin conversations with MfA colleagues.	111
Thursday Thinks are monthly events, open to both MfA teachers and their colleagues from the larger math and science community. These events feature engaging and accomplished speakers who delve into cutting edge topics in math and science.	8
Chancellor's Day Workshops are full day workshops for MfA teachers where experts from the MfA Master Teacher community as well as outside academic institutions engage MfA teachers at the cutting edge of their content area and/or pedagogical practice.	7
Community Contributions are required for Master Teachers who have renewed their fellowship for another four years. They provide opportunities for Renewed Master Teachers to deepen their connection within the MfA community through participation in admissions, recruitment, mentoring, communications, facilitation, and more.	15
Total # of Activities:	141

Professional Development Experiences

In examining MfA teachers' feedback from the 2017-18 Spring Reflection Survey described above, we noticed that courses of longer duration with multiple sessions, such as Extended Learning Courses, Mini-Courses and Professional Learning Teams, were most frequently chosen as among the most meaningful

professional development experiences. The results are summarized in the chart below. Moving into this school year, we are focused on increasing the number of teachers who have opportunities to participate in recurring course formats.

Credit-bearing course formats	% teachers participated in 17-18	% teachers ranked as a top 3 experience
Mini-Courses	86%	74%
Single Session Workshops	85%	45%
Professional Learning Teams	63%	67%
Extended Length Courses	13%	72%
Cohort Meetings	11%	62%

Activities (non-credit-bearing)	% teachers participated in 17-18	% teachers ranked as a top 3 experience
Interest Groups	43%	25%
Thursday Thinks	37%	29%
Chancellor's Day Workshops	17%	21%
Community Contributions	12%	33%

IV. School Impact

Understanding the specific level of impact from the MfA Master Teacher Fellowship experience is an ongoing area of growth for us. During the 2017-2018 school year, we focused our school impact research efforts on a small sample of MfA Master Teachers. During the coming year, we are focusing significant time and effort in collecting clear and comprehensive answers from a larger sample of Renewal Master Teachers to the following two broad questions:

1) To what extent has your MfA fellowship had noticeable impact on your professional life as a teacher?

2) To what extent has your MfA fellowship created opportunities for you to make a noticeable impact in your school community?

In the upcoming year, we are running multiple focus group interviews, visiting schools, and designing other forms of data collection in order to answer the above questions and better understand our impact. In the meantime, we have also been piloting an approach to support Master Teachers in bringing MfA's Professional Learning Team (PLT) model into their schools to expand our impact. Below we describe two cases of teachers who have applied MfA structures for PLTs in their respective schools.

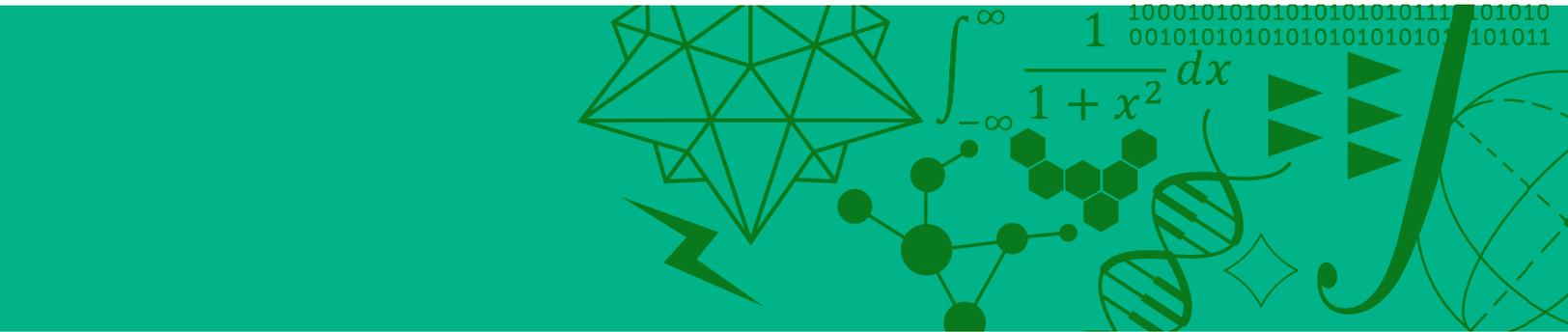
Professional Learning Teams (PLTs) in Schools

The MfA model builds community, fosters collaboration, and inspires active participation. In 2016-17, we published [resources and tools](#) related to these three attributes. In 2017-18, we looked at how MfA Master Teachers used them in their own schools, especially by introducing Professional Learning Teams (PLTs). In the fall, a group of 12 Renewed Master Teachers worked with our staff to design a plan to introduce and facilitate PLTs in their schools. Below, we share a summary of two teachers who participated in the PLT pilot.

Jordan is a science teacher and has taught High School Biology for the past 10 years. For the past three years he has facilitated the science department team meetings at his school. He has had a fair amount of success leading these meetings to plan curriculum and collaborate with colleagues to problem solve, but wanted to delve deeper with protocols to better structure the meetings and truly identify teachers' problems of practice. The department at his school is new to the Next Generation Science Standards (NGSS), and Jordan saw an opportunity to use the PLT structure modeled at MfA to problem solve as he and his colleagues worked to construct more NGSS-aligned lessons.

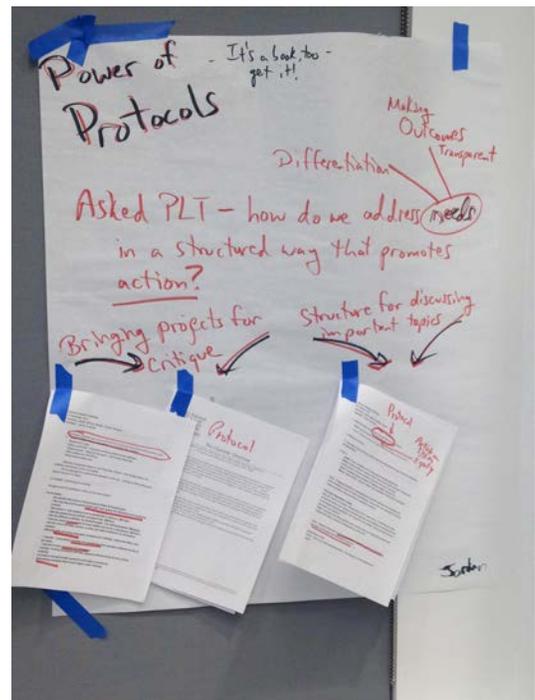
Jordan's regular department meetings became structured around the use of protocols for equitable engagement, allowing his school-based PLT to make the teaching practices on his team visible so they could be discussed and analyzed. His colleagues report that they are committed to growth and improvement, and the PLT structure has provided a clear focus for them.

"We've started using protocols to discuss our expectations and projects with students. In particular, we've started using research articles to ground our conversations about equity..."



Through MfA, Jordan was able to share his progress with other MfA Master Teachers, to solicit input and advice, and discuss with colleagues experiencing the same challenges. He reported that the PLT protocols and MfA resources led his team to deep, meaningful work at his school.

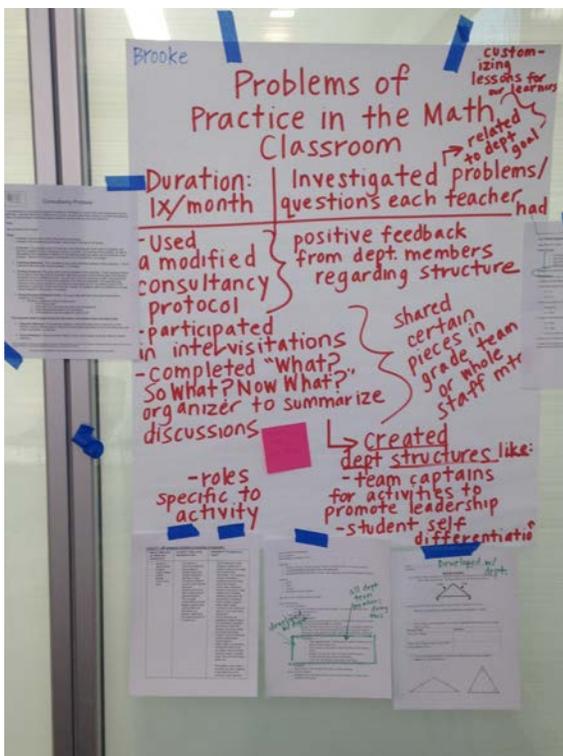
Brooke is a High School mathematics teacher and has been teaching Algebra I and Geometry for the past nine years. As department leader at her school, Brooke wanted to increase the use of a range of student artifacts centered around a problem of practice among her team meetings with her colleagues. With a department-wide goal of differentiation, Brooke saw the PLT structure as one that would best enable her colleagues to identify strategies the math department could discuss and then share school-wide. Equitable engagement of all teachers was supported throughout, because each month a different teacher was asked to bring in an artifact for discussion.



As the PLT met, Brooke shared details of their work with her fellow MfA teachers in the pilot:

"I brought in a problem of practice from my Geometry class and the math department used a modified consultancy protocol to help me modify my lesson. I recorded all of the suggestions into a graphic organizer and shared it with the department. My colleagues really liked using the modified consultancy protocol to structure our meeting and we all left with good ideas to use in our classroom."

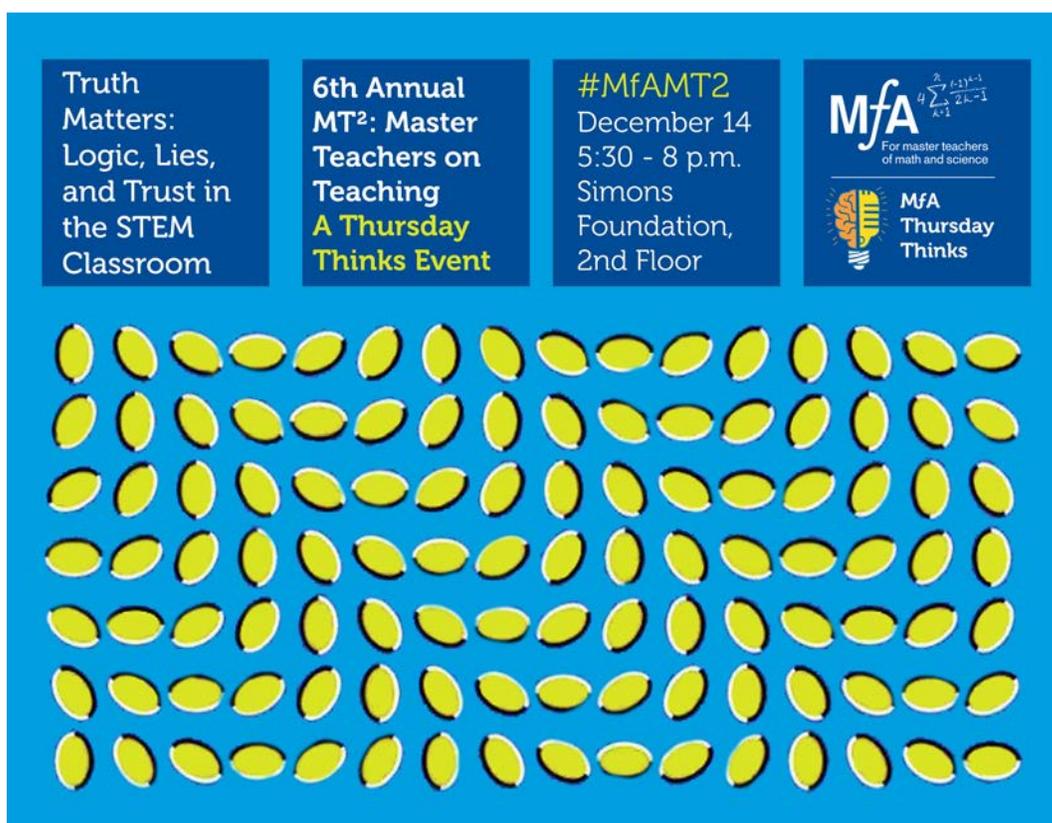
These two stories highlight some of the ways Master Teachers are bringing structures from MfA into their schools. With the support and guidance of MfA staff, they have been able to collaborate with teachers in their schools to create more meaningful, focused learning together. As we learn more about what teachers need to support this school-based work, we will continue to develop meaningful facilitation supports and tools for teachers to take back to their classrooms.



V. Annual Spotlight: MfA Master Teachers on Teaching (MT²)

The MfA MT²: Master Teachers on Teaching event has evolved in scope and depth since its inception in 2012. It is an annual event to celebrate a group of accomplished teachers by giving them the opportunity to be part of a special evening of content-focused talks led by their peers. Featuring topics ranging from vertical alignment of mathematics curriculum in early grades to support college-level learning in high school, to building trust with students in STEM classrooms, MT² has a different theme each year that invites speaking applications from both math and science teachers across MfA.

Flyer for Master Teachers on Teaching Event 2017



Now a part of our broader Thursday Thinks speaker series, MT² is a mainstay at MfA and an event that has a wait list each fall. Structured similarly to TED style talks, teacher speakers give 8-10 minute speeches about key experiences, learnings, or strategies from their math and science classrooms to an audience of 200. Speakers are chosen through an application proposal process, which has grown increasingly competitive each year.

We began to recognize that teachers presenting at MT² want and need public-speaking coaching in preparation for their talks. So, for the past three years, we have selected a past MfA Master Teacher speaker to serve as the "speaker coach" for those presenting at MT² the following year. The speaker coach then works with the group of

speakers for approximately six weeks to practice, refine, and improve their talks in preparation for the event. Celebrating teaching and sharing experiences are essential values of MfA, and MT² exemplifies both of these values. It is also important to highlight that for many MT² speakers, this is the first opportunity they have to speak in a large public setting, which is why we wanted to shine a spotlight on it in this year's Annual Report. Teachers tell us the opportunity to speak at MT² makes them more confident to apply to present at conferences in and beyond NYC. This furthers one of our goals of amplifying the voices of teachers to influence the teaching profession as well as to inform discussions and debates about K-12 STEM education.



2017 MT² Theme: "Truth Matters: Logic, Lies, and Trust in the STEM Classroom"

2016 MT² Theme: "The State of STEMocracy: What is Fair and Balanced in our Classrooms?"

2015 MT² Theme: "Equality/ Inequality"

2017-2018



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