The NNSTOY - Voya Stem Fellowship continued the robust partnership of NNSTOY members (State Teachers of the Year or Finalists) with early career teachers to advance practice and raise the quality of STEM teaching and learning. This Fellowship is unique in that it is not a veteran to early career teacher mentoring model. The Voya STEM fellowship thrives because all fellows work as a collaborative learning team to model teacher leadership without any focus on hierarchy or status. This year, Voya STEM fellows explored how to improve teacher preparation and professional development to increase student interest in STEM careers. The interest, learning, and engagement this year by the fellows and their students were outstanding. Fellows learned about numerous STEM careers, built trusting relationships with STEM professionals, and created STEM career learning opportunities for more than 3,700 students. Voya STEM fellows are building the Rock Star strategies, relationships, and experiences that increase student interest in STEM careers. I am incredibly proud of the quality of work completed this year.

Bob Williams
NNSTOY Acting CEO

Overview
The work of the Voya STEM Fellowship has been governed by three essential questions:

1. How can professional learning opportunities be reimagined to empower STEM teachers with the skills they need to create robust learning environments?
2. What changes could be made to teacher preparation and professional learning in order to directly increase interest in STEM careers among students?
3. What activities or learning programs will lead to those outcomes?

Our work for this fourth year of the Fellowship focused on essential question 2. In almost every available list regarding 'jobs of the future', a majority of the careers listed are in STEM fields. And yet, we are still not attracting enough students into STEM careers, particularly in underrepresented populations. In order for our students to find STEM career success, we believe they must master a set of transferable skills that enable them to think out of the box and solve a growing list of environmental, social, and economic issues. Further, we believe our students must learn how to use and develop new technologies and systems that enable them to collaborate with diverse groups of people on the global stage if we are to produce citizens that will thrive and be successful in their lives and in their careers.

Our vision for Year 4 was to:

1. Create professional learning for Fellows, through a lens of equity, that deepened STEM teacher understanding of the importance of the prerequisites for STEM careers and the
methods teachers could use to build enthusiasm, excitement, and realistic pathways for students to pursue STEM careers.

2. Learn how to build trusting and collaborative relationships with STEM professionals that include bringing STEM professionals into the classrooms of Fellows in-person or virtually.

3. Increase student agency through having students explore the prerequisites and competencies that are applicable across many STEM careers

Our initial survey of Voya STEM Fellows elicited some interesting, but not surprising, findings. For example, 8 Fellows responded that prior to this year, they had never received any professional learning (PL) about STEM careers. The vast majority of Fellows reported that any professional learning they had received came via their own efforts and research, or was a ‘one-off’ presentation or workshop.

Of those who had received PL about STEM careers, only 6 Fellows reported that the PL was job-embedded and sustained over time (3 of those 6 were instructional coaches). Six of our Fellows indicated they had previously used a career interest survey with their students as part of their teaching, and interestingly, 5 were the same who reported having job embedded PL. When viewed through the lens of the demographics of this Fellowship participants (everyone is either a State Teacher of the Year or an early career educator who has been mentored by a State Teacher of the Year), one can extrapolate that nation-wide, there are very few job embedded opportunities for classroom teachers to formally learn about STEM careers. This also implies that STEM career training is also not a part of pre-service teaching programs. Furthermore, only 6 Fellows reported regularly embedding formal STEM career activities/lessons into their content teaching, 3 of whom were instructional coaches. Of the 3 classroom teachers, 1 was an elementary teacher and 2 were non-core academic teachers. This, again, suggests that most classroom teachers lack sufficient training (or possibly time within their content curriculum) to overtly engage in STEM career lessons as a part of their regular teaching. It also suggests that schools which lack instructional coaches in STEM areas could be less likely to offer their
students STEM career related activities as part of classroom instruction. Several Fellows commented that career interest surveys were provided through their schools’ guidance program (i.e. Naviance) but that the data was not distributed to teachers or used in any formalized way to plan learning activities.

With these data as our backdrop, we established the following participation expectations for each Fellow during Year 4 of this Fellowship:

1. Attend 4 Professional Learning Sessions, facilitated by the Fellowship co-leads in which a diverse group of STEM professionals would speak about their career pathway and schooling experiences (December 2020 - February 2021)

2. Participate in 2 small group sessions, organized by grade bands, to discuss current articles and research about STEM careers and workforce development (March and April 2021)

3. Plan a minimum of 3 STEM Career Engagement Activities with students, and provide artifacts of these experiences. (March 2021 - June 2021)

4. Attend a final collaborative meeting to summarize STEM career learning/engagements

Professional Learning

<table>
<thead>
<tr>
<th>STEM Career Guest and Discussion Questions</th>
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<tbody>
<tr>
<td>- How did you first get interested in this career path? What were some of your strongest influences?</td>
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<tr>
<td>- Young people often like the idea of &quot;being a scientist&quot; as a career without really understanding what that entails. How have your experiences matched up to what you thought &quot;being a scientist&quot; would be like when you were younger?</td>
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<tr>
<td>- What were some of the peaks and pitfalls you experienced transitioning from an American university system to an Australian system?</td>
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<tr>
<td>- Looking back, what were some experiences in your K12 education years that helped or hindered your STEM career path goals? If you had the opportunity to go back and change things, what would you change?</td>
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</tbody>
</table>

Michaela Miller
PhD Candidate
Department of Marine Biology
James Cook University
Queensland, Australia
- What advice do you have for us, as K12 teachers, for how to help support/prepare our students to follow a career path similar to yours?

- Tell us about your career path in nursing?

- How did you first get interested in nursing as a career? What were some of your strongest influences?

- There are many different pathways and careers within the nursing profession. What do you think is important for us to know, as K12 teachers, about these pathways and careers?

- Young people often like the idea of “nursing” as a career without really understanding what that entails. What are some of the challenges you think some people face when entering the nursing profession?

- What advice do you have for us, as K12 teachers, for how to help support/prepare our students to engage in a nursing career path?

- There are many different ‘types’ of engineering. What characteristics or skill sets might make a person be more well-suited for one area of engineering versus another?

- Kids often cite "engineering" as a career choice without really knowing what it entails. What misconceptions are out there about pursuing engineering as a career?

- As an engineering professor, what skills do you wish more students brought with them from high school?

- If an elementary or middle school student told you they wanted to be an engineer, what advice would you give them about how to succeed on that career path?

- What do you wish more K12 educators knew
| **Michael Clifford**  
*Curator of Innovation and Partnerships*  
*GLMV Architecture*  
*Wichita, KS* | **Questions**  
- How did your early volunteering experiences help guide your career explorations?  
- What don’t teachers know about the “real world” that could help their students better explore passions in STEM careers?  
- What are the benefits for students and industry when professionals share their work and stories with K-12 students?  
- What mindsets do students need in their STEM career journeys?  

| **Thelma Manley**  
*College and Career Coordinator*  
*Southeast High School*  
*Wichita Public Schools*  
*Wichita, KS* | **Questions**  
- What don’t teachers know about the “real world” that could help their students better explore passions in STEM careers?  
- What are the benefits for students and industry when professionals share their work and stories with K-12 students?  
- What don’t teachers know about career counseling? What are the myths and what’s the reality?  
- How do we go about opening career explorations for students in the classroom so they have better knowledge when they work with you?  

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Key takeaways from our Fellows after learning from our STEM Career guests were:

- Though there was a diversity of careers represented, many guests said similar things about the skills necessary to be successful in their field, highlighting key areas of learning experiences that should happen in schools.

- Communication skills are equally important as science and math knowledge, as is data collection and rigorous analyzation.

- Early engagement with the engineering process is highly desirable, as are internship opportunities.

- Making connections to other content areas in their schooling allowed guests to
understand how their learned skills could be applied in many different areas

- Each guest had a ‘non-traditional’ or originally ‘unplanned’ pathway to their current career, highlighting the importance of adaptability, growth mindset, and openness to new experiences

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### Key Takeaways from Articles Discussed During Small Group Meetings

<table>
<thead>
<tr>
<th>March - Elementary</th>
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| **How to Build an Engineer: Start Young** | The gap between boys and girls in math performance is greater in affluent areas than in low-income areas.  
Younger students respond well to the engineering process.  
The field of engineering is expected to grow as a profession by 8.3 percent. |
| **Speaking Skills Top Employer Wish List, But Schools Don’t Teach Them** | There are speaking and listening standards included in Common Core State Standards but they are often not taught or are not taught in a way that reflects a workplace setting. They are also not assessed on state tests.  
In multiple surveys, employers said strong communication skills were even more important than good reading or writing skills.  
In real life, you need your ‘60 second elevator speech’ to make your point, which is contradictory to the long elaborate book report speeches students are often assigned. |

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<tr>
<th>March - Middle</th>
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<tbody>
<tr>
<td><strong>Speaking Skills Top Employer Wish List, But Schools Don’t Teach Them</strong></td>
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</table>
Education and the business world need to be in constant and consistent communication to ensure that teachers are teaching what the community needs, but they are not. Teachers have worked hard to instruct high-need STEM skills but it won’t matter if the students can’t market themselves appropriately to employers.

### Teaching Students to Wrangle “Big Data”

Real-world application is what gets the ‘non-math’ kids engaged in learning math.

Data science shouldn’t be left to high school teachers - early exposure helps keep kids engaged in this skill set.

Labor markets have a huge demand and a high base salary for those who can manage data and statistics.

### March - High school

#### Speaking Skills Top Employer Wish List, But Schools Don’t Teach Them

Students are not overtly taught speaking skills, but by high school we assume that they have these skills.

Speaking skills must be taught to be mastered, but most STEM educators are not trained in how to teach students these skills - in general, few teachers in any content area are trained in such.

Schools can’t understand the skills employers need without having a conversation with employers and we can’t assume there is a pipeline between business leaders and teachers.

#### Teaching Students to Wrangle “Big Data”

Only 1 in 3 college graduates report needing content past algebra 2, except for those in physics and engineering fields.

Cross-curricular content (social studies, politics, etc.) embedded into science and math learning help our students understand how data and statistics are used in our daily lives in making connections with real-world issues.
Issues of equity and access come into play when counseling/advising students on math courses to take in high school because selective colleges still want to see calculus on transcripts; statistics courses are viewed as a less rigorous pathway.

<table>
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<tr>
<th>March - Instructional Support/Coach, Higher Ed</th>
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<tbody>
<tr>
<td><strong>Speaking Skills Top Employer Wish List, But Schools Don’t Teach Them</strong></td>
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<tr>
<td>Oral communication is a skill employers greatly desire from students entering the workforce.</td>
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<tr>
<td>More communication needs to take place between teachers and workforce stakeholders to ensure students have the skills needed to contribute to the workforce.</td>
</tr>
<tr>
<td><strong>Teaching Students to Wrangle with ‘Big Data’</strong></td>
</tr>
<tr>
<td>Creating a data science class in high school is a powerful approach because it connects students to real world data tracking and helps them learn how to make meaning of it.</td>
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<tr>
<td>Data Science is a blend of statistics and computer science, designed to help students understand and use the “big data” that shapes modern life. The labor market is hungry for skilled data wranglers, and pays them well, but few schools offer data-science classes.</td>
</tr>
<tr>
<td>You can’t do responsible data analysis without knowing something about the subject you’re analyzing. The need for content expertise presents a ‘natural opportunity’ to weave data projects into all academic subjects. But that requires teacher training.</td>
</tr>
<tr>
<td><strong>Why Do Girls Lose Interest in STEM? New Research has Some Answers - and What we can do About it?</strong></td>
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<tr>
<td>Dads can have a greater influence on their daughters than moms, yet they are less likely than mothers to talk to their daughters about STEM.</td>
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<tr>
<td>We have to teach girls to be “imperfect” and can use computer science to teach girls that it is alright to fail, because that's how we move forward in computer science.</td>
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There are still persistent stereotypes that emphasize who “belongs” in STEM and who can be good at it.

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<th>April - Elementary</th>
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<tbody>
<tr>
<td><strong>5 Big Challenges in Preparing K12 Students for the World of Work</strong></td>
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</table>

More than half of the 586 school and district leaders who responded to a survey in December by the EdWeek Research Center—51 percent—said that updating curriculum to get students ready for the jobs of the future is a top priority.

Parents and the community see career preparation in K-12, as well as career and technical education, as a second-tier option for students who are not college ready.

Lack of internships is a missed opportunity for students. Work-based learning experiences can help students figure out not just what careers students might like, but which ones aren’t for them, educators say.

| Speaking Skills Top Employer Wish List, But Schools Don’t Teach Them |

It is rare for high school students to learn verbal communication skills for a real world scenario.

The “elevator speech” is becoming an integral part of communication in our society.

Listening is as important as speaking.

| STEM Pathways for Girls of Color: A Review of the Literature |

There are implicit and explicit biases in curriculum and school culture that result in enrollment that is frequently unrepresentative of the student population.

Current educational practices have resulted in disproportionately low participation of males and females of minority racial and ethnic backgrounds due to differences in opportunity, achievement, and support.

STEM has to be taken seriously early on. Science should have an equal amount of planning time and similar learning time to that of other subjects.
Curriculum funds for STEM need to exist! With proper time, planning and materials, students would be able to explore a world they currently don't know exists.

April - Middle School

<table>
<thead>
<tr>
<th><strong>Dream Jobs out of Sync w Emerging Economy</strong></th>
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<tbody>
<tr>
<td>What we know about areas of job growth is out of sync with what is being taught in classrooms and the experiences of kids/young adults.</td>
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<tr>
<td>Kids' perspectives about jobs and careers has narrowed over time, rather than expanded - almost half of all kids surveyed aspire to work in only 10 job types (i.e. doctor, teacher, lawyer, police, nurse, vet, architect, etc)</td>
</tr>
<tr>
<td>Children from lower income families are not exposed to career networks as part of their home lives in the same way middle and upper class children are, making them less likely to know how to navigate jobs and career searches in many professions.</td>
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April - High School

<table>
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<tr>
<th><strong>5 Big Challenges in Preparing K12 Students for the World of Work</strong></th>
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<tbody>
<tr>
<td>Bias still exists that career-related curricula is for students who don’t plan to pursue a postsecondary education.</td>
</tr>
<tr>
<td>Jobs are getting displaced because of the rapid pace of technological change - kids need to master skills they are sure to need no matter how technology evolves.</td>
</tr>
<tr>
<td>We’re not looking at ‘where we are going’ enough as a society and this is going to exacerbate already existing opportunity and equity gaps in access to jobs and careers.</td>
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</table>

April - Instructional Support/Coach, Higher Ed
| **Students’ ‘Dream Jobs’ Out of Sync with Emerging Economy** | Most of the jobs that students list as their dream job are ones that are 19th/20th century jobs (not keeping up with technology and social changes).

Modern career choices seem to be “blurrier” than in the past. Students don’t really know what the tasks associated with jobs are, or might know the tasks but not the job title.

There is a mismatch between the high paying jobs that kids want and the skills sets and education that they have or are planning to obtain. |
| --- | --- |
| **How to Build an Engineer: Start Young** | Numerous surveys have found that nearly half of elementary teachers feel underprepared to teach science.

What people perceive as an engineer is not always what an engineer is. STEM education opens career opportunities that engage all types of learners and thinkers. |
| **STEM Pathways for Girls of Color: A Review of the Literature** | The need for further investigation in various STEM experiences over time impacts young women’s (primarily African American and Latina women) identity development and confidence and influences persistence in STEM.

Women make up 26% of the STEM workforce, yet only 2% of the STEM workforce are African American and Latina women. |

Based on the PL provided to Fellows during this year, the following are key findings our Fellows put forth about STEM careers:

- There are fulfilling STEM career paths open to students of all ability levels and interests. Educators need to learn how to advocate for the importance of exposure to STEM careers in all classrooms, for all students.

- STEM careers are far more than simply engineers, scientists, and people in the medical field. The career opportunities are as diverse as the students we teach, but educators, their students, and the families of their students generally do not have a strong understanding of this.
● Representation matters - students need to see successful professionals who look like them and come from similar backgrounds in order to be able to see that a particular career path could be for them. This is particularly true for students of lower socioeconomic status, who may not have exposure to professional networks as part of their day to day community life.

● The future jobs in the workforce are going to be different that the careers that exist now, and many STEM jobs projected to show high growth are in career areas unfamiliar to both students and teachers - more professional learning about this is necessary so that students can be exposed to a variety of STEM career possibilities and break stereotypes that may be held.

● Engineering is generically used as a STEM career buzzword that leads to lots of money, but neither K12 educators nor their students really know much about the many types of engineering careers that exist or pathways into such careers.

● Communication, collaboration, and critical thinking independently based on good questioning are highly important skills in all STEM careers, and in many cases more important than specific content knowledge.

● The path to a STEM career does not have to be straight, and not all STEM careers are explicitly 'labeled' as such. Many STEM professionals take indirect paths filled with differing experiences to find their 'life career'.

● Educators need to be explicitly trained how to successfully partner with industry professionals to improve transitions between K12 education and careers.

Work with Students
From March 2021 - June 2021 our Fellows planned and executed a minimum of 3 STEM Career Engagement Activities, inclusive of in-person classroom visits or virtual video conferences with their students. Our fellows reported that in total, 3700 students were impacted by their STEM career activities this year - 70% of those were in suburban schools, 15% were rural, and 15% were urban. These schools had the following demographics:

<table>
<thead>
<tr>
<th>School's Percentage of Students of Color</th>
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![VOYA Logo]  ![NSTOY Logo]
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<tr>
<th>Grade Level</th>
<th>Experiences Created for Student STEM Career Investigations</th>
</tr>
</thead>
</table>
| Elementary School    | ● **STEM virtual** and in person career question and answer sessions inviting diverse career fields to share their experiences and passions with students/  
                      | ● **White Coat Ceremony** led by medical professionals for the elementary students. In this event, students heard from a variety of STEM professionals and each received their own medical white coat with a pin.  
                      | ● **STEM guest speakers** aligned with content units to provide deeper explanations of curricular concepts and to act as a resource for student curiosities.  
                      | ● **Virtual STEM Fest Week** where students and families listened to a STEM panel of experts about their careers and then students each received a kit of materials for a week’s worth of STEM challenges.  
                      | ● **Lessons that focused on STEM careers** and the importance of public speaking skills in STEM fields.                       |
| Middle School        | ● **STEM Career Panels** for student question and answer sessions.  
                      | ● **Engineer Career exploration guest speakers** to increase awareness of engineer opportunities in multiple fields  
                      | ● **Pre-recorded interviews with STEM professionals** and university students sharing their personal journeys so students could watch, take notes, and reflect on how these leaders |
influenced their interest in STEM careers.

- **Designing STEM career investigation planners** for students to take notes from STEM guest speakers and then align those notes with global competencies and skills needed to be successful in STEM careers.
- **Investigations into skills and mindsets** needed for success in STEM careers

### High School

- STEM Career investigations through data tables and STEM articles
- Explorations in CTE programs provided in the school/district
- Providing STEM scholarship resource list for interested students
- **Varied CTE STEM guest speaker question and answer sessions**
- Designing a 2022 high school student tour to Germany and Italy to investigate STEM careers in automotive design and manufacturing
- Hosting conversations with graduates from the same high school to share their STEM career journeys.
- Research opportunities with local automotive unions for career connections.
- Independent STEM career projects focused on innovation needed in STEM career fields.

### Instructional Coach/Higher Ed

- Designing and hosting virtual STEM career fairs for all grade levels
- Virtual field trips to STEM businesses, manufacturing centers, and ecological research locations.
- Launching a Women in Science and Engineering virtual guest speaker program for direct-to-classroom K-12 connections.
- Health Science Career Fair for freshmen students
- Artificial Intelligence in STEM fields investigations
- STEM Career Meet and Greets at all grade levels

Some relevant reflections from our Fellows about how their STEM Career Experiences impacted students include:

> “This was so different because students could truly see that this is not just reading about a job and the skills you need to have, but instead they can see sometimes our paths might be messy and we zig and zag until we find what works best for us. The skills we are learning now are actually being applied by a coder for a cloud storage company.”

(CB)
“I think my focus was on exposing students to the many possible paths that could lead into any number of automotive careers. I specifically looked for individuals who didn’t follow the "cookie-cutter" path of college, then straight into their career.” (JK)

“These interviews were really important for some of my students and helped them learn about how they can grow through failure, curiosity, inquiry, and taking risks. I stepped outside of our required curriculum to teach this because I thought it was important, and I am still waiting to see if the DO comes down on me. I also think this helped kids to see that what we talk about in science isn't just talk; it's applicable and it's part of the real-world.” (HB)

“I have never had a guest speaker or visited any classroom with my students. This gives students the opportunity to see what goes on in that classroom that prepares them for those careers or higher education (after high school), they can ask questions, and explore/discuss career interests in groups. It has them thinking/planning about the possibilities of STEM careers and inspires them.” (TK)

“Unfortunately in the past I may have only talked about or read about people who have STEM Careers, but this year having people live for students to engage in conversations with, was more impactful.” (NG)

“My students appreciated the opportunity to hear from professionals in the field. They believe those experiences challenge them to perform at a higher level.” (JF)

“These students were blown away (as was I). They are often convinced that our classes now are unnecessary for the real world and they will learn what they need to in college. The live STEM Career Experience allowed for them to understand the very things they are learning and doing in class today can and will be used in their careers. Middle school is not just a waiting period for them anymore, they want to go out and start their jobs now! The reaction was so powerful that the engagement level even through a screen was more than ever expected.” (AD)

“I usually expose my students to STEM careers and they are alway impressed with the professionals. However, [because of the pandemic remote learning situation] my families were also motivated since they were right there by the computers with their children due to virtual learning. As a result, I surveyed my school community to see what steps to take next year to involve family members in these conversations.” (MC)

“Students were excited about the possibilities. They see that certain careers they thought were not for them are actually attainable. They learned to see struggles as positive. They now know about careers they had not heard of before. They considered the ethics of data where they had not thought about it previously.” (CM)

“The way it was really different this year is that I was able to say, ‘Remember Mrs. Smith who spoke to you during the Career Fair? She does work like we are doing in class today.’ “ (AG)
“Students heard a consistent message from all the guest speakers about inspiration, perspiration and dedication. They need that reinforcement to understand that they need to have resilience in life.” (NN)

**Connections to Previous Work**

In order to connect back to our work from previous years of the Fellowship, we asked our Fellows to identify which of the following characteristics most resonated with them when considering our professional learning about STEM careers (beyond Collaboration with Colleagues/Organizations/Businesses to Improve Student Learning).

<table>
<thead>
<tr>
<th>Rock-star STEM Teacher Characteristic</th>
<th>Connections to High Quality STEM Career Learning Experiences</th>
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<tbody>
<tr>
<td>Inspire Curiosity and Inquiry</td>
<td>Learning about careers should be inquiry-based, not just a 'sit and get' experience; planned experiences with these characteristics in mind do a better job of sparking students’ interest in possible careers paths</td>
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<td></td>
<td>Showing students what their futures could look like allows for excitement about what’s next for them</td>
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<tr>
<td></td>
<td>If we can get students curious about what is possible they will want to learn instead of adults begging them to learn.</td>
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<tr>
<td></td>
<td>Career exploration needs to be an iterative process that occurs over many years and in many different ways. Students need to be able to ask questions, try</td>
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</table>
things out, revise their thinking, and ask more questions.

| Exposing Students to Real World STEM Research/Problem Solving | Students who connect what they are learning about in the classroom to the world around them are more likely to experience links into STEM career paths. Today's students are interested in careers that positively impact people and the community. Exposing students to real world STEM research/problem solving makes it more likely they can see how STEM careers can meet those personal goals.

Students need to overtly be taught how to market the STEM skills they possess to the careers they want. |

| Encouraging Academic/Learning Risk Taking | Finding out what you don’t like or doesn’t work for you often leads a person to finding their niche career. Many students feel that they need to ‘know’ their whole career path before they leave high school, but this does not reflect the experiences of many STEM professionals. If educators don’t create an environment that fosters risk taking while learning, our students may never commit to taking risks in their career path or learn the resilience necessary to persevere. It takes vision and persistence to help students and their families understand that traditional career pathways are no longer the only pathways. |

| Building Classroom Culture/Positive Student Relationships | Without this, it is impossible to promote curiosity or risk-taking while learning about STEM careers. Students will only engage in meaningful ways with guests to their classroom if their teacher done the work to established an environment of trust and authenticity |

**Conclusions**

Based on the work of our Fellows, the following are key takeaways we feel every STEM educator should know about providing STEM Career Experiences for students:

- Educators need to overtly look for guests who will tell a story to students and authentically engage, not just read a PowerPoint. Guests who reflect the demographics
of the student body and who represent diversity in STEM careers are essential because students need to be able to see themselves in the careers

- Careful planning is key - without it you can lose the interest of students and it is not meaningful.

- Questions matter! Rich conversations are had through the development of high-quality questions from the teacher that are shared with the guest in advance, but student questions also generate solid interest and personal connections.

- Students wanted to hear about their career options from the viewpoint of what they are learning in class right now - making overt connections to content and skill learning is key to having a meaningful experience for students.

- Students are much more engaged with a live speaker to whom they could ask questions. Pre-recorded interviews or public opportunities that have hundreds of participants are less likely to be high-quality experiences for students, and may actually be more of a turnoff. Time to truly interact with guests is important.

- Always have some type of reflection that you do as a class after the career engagement so that students don’t view it as a ‘one-off’ experience. Just like teacher PL should be job-embedded and sustained over time, so should students’ engagement with STEM careers. Encourage students to listen to each professional's explanation of their daily experience at their job, why they chose that field, and the reasons they enjoy what they do.

- Most students already have some awareness of the more popular STEM jobs that they may have more frequent interactions with. The goal should be to expose students to new STEM areas they never knew existed or to dispel stereotypes about known/popular STEM careers, or both!

- Don’t assume guests know how to interact with students. Educators may need to overtly prepare their guests and support them, as much as they would support their kids through a new experience.

- Start small with a meaningful experience and build from that. One well-planned, powerful experience is much better than several ‘easy gets’.

In summary, the work done during Year Four of the Voya STEM Fellowship has not only significantly impacted the Fellows themselves, but also their students. As a cohort, it quickly became apparent that in many aspects of STEM careers, we didn’t know what we didn’t know. This realization was both exciting and challenging. Exciting because it opened up a brand new component to our vision of what it means to provide robust STEM learning environments to students, but challenging because we came to understand that classroom teachers often do not have sufficient expertise in, or access to professional learning about, workforce development and STEM careers. The questions then quickly became:
1. If we are truly going to increase interest in STEM careers among our students, what do we, ourselves, need to know and be able to do?
2. How do we purposefully access that knowledge and build that skill set?
3. How do we demonstrate that what we are doing in our classrooms has truly moved the needle in that goal?
4. How do we scale these efforts to impact more educators and schools?

While we have begun to address some of these questions, there is still much more work to be done in this area. As mentioned earlier in this report, lasting impacts on student career choices require ongoing, thoughtful, and sustained learning experiences - not just for our students, but also for educators. This Year 4 of the Voya STEM Fellowship has scratched the surface of an incredibly important topic and has generated excitement and enthusiasm among the Fellows for where our work could take us as we emerge from the pandemic and continue to reimagine what school could look like in the future.

We close with additional reflections from our Fellows about our year together:

➔ “This fellowship has allowed us to think about how we should be engaging students in STEM career exploration through inquiry based learning.” (MC)

➔ “The professional development I have experienced through this Fellowship was at a different level than I have ever experienced before. Being able to speak with, share ideas, and learn more about what outstanding STEM educators are doing in other parts of our country has given me an opportunity to learn, grow and improve best practices. The research I have been doing to incorporate the strategies and ideas from this fellowship has increased my knowledge and motivated me to embed more STEM careers in the curriculum/lessons. I would like to improve opportunities for students in our district through a STEM pathway that guides them and prepares them for future opportunities and careers in STEM.” (TK)

➔ I had helped put a STEM career week together in the past, but this year I was intentionally planning and thinking about the long term effects of our STEM week and how it would affect my students’ futures. It ended up being a much more robust experience for everyone. And honestly, I had not intentionally planned anything STEM career related in the past for my classroom, but now it is a must! (CB)

➔ “This Fellowship pushed me to take things I had been doing with STEM careers to the next level. What I put together for my students was one more than just one day or one random visit, and the kids were able to see multiple examples of diverse and surprising people in STEM.” (HB)

➔ “I realized this year that I need just as much exposure to these different types of STEM careers as the kids do.” (KT)

➔ “This year of the Fellowship was a huge learning opportunity for me on how to coordinate presentations, what is important in a presenter’s talk, and finding the right
people. I gained a new perspective of what information should be given to STEM presenters ahead of time in order to have the best session possible.” (RP)

➢ “In this Fellowship the co-leads brought in guest speakers for us to see and practice with first. After seeing how interested I was in hearing a speaker, it truly provided me with the motivation to do the same in my classroom. The more modeling we get the better educator I feel I am becoming! Please continue to bring in guests and allow us as educators to practice first and then try on our own kids/staff - it’s so helpful!” (AD)

➢ “The conversations with this group enlighten me each time I am online, and provide new thoughts about a variety of subjects. The careful planning of our fellowship co-leads is evident and provides us with a chance to think, act, reflect, and apply what we are doing over a long time period. It is action research. This is a critical component of our profession and one that is not common.” (MP)

➢ This Fellowship has provided the most "realistic" type of professional learning I get in my job. Our work is all about how you make it real and bring it back to the classroom - I appreciate that part big time! (KT)