STEM Career Engagement Guide

Collaborating with STEM Professionals in the High School Classroom

So, You Want to Engage High School Students in Thinking about STEM Careers?

It's no secret that many of our students have a goal of pursuing a career where they can apply their skill sets and knowledge to assist other people. But in order to be competitive in the professional world, our students must develop 'future-proof' skills such as collaborative problem-solving, learning from failure, effective communication in multiple modalities, and creative risk-taking. Educators can show students how a robust understanding of Science, Technology, Engineering, and Math (STEM) content, in addition to building critical thinking, collaboration, and problem-solving skills, opens them up to opportunities to tackle our world's grand challenges as they try to figure out what kind of difference they want to make in the world. Finding STEM career success means that students must master a set of transferable skills like these to enable them to solve a growing list of environmental, social, and economic issues. They must also learn how to use new technologies and systems to enable them to collaborate with diverse groups of people on the global stage in order to thrive and be successful in their lives and in their careers.

As educators, we face many challenges in preparing our students for the world of work. Often, students' dream jobs are out of sync with the emerging economy. The future jobs for our workforce are going to be different from the careers that exist now, and many STEM jobs projected to show high growth are in career areas unfamiliar to both students and educators. Career opportunities are as diverse as the students we teach, but our students and their families generally do not have a strong understanding of this. When students have an opportunity to learn directly from STEM professionals, they start to gain interests, which can support them in finding their niche career. Students often feel that they need to 'know' their whole career path before they leave high school, but this does not reflect the real journeys that people take to find their niche. This guide is designed to help educators bridge the gap between STEM careers and educational spaces.

Planning for STEM Career Exposure Success

In order to make the most impact on students when bringing STEM professionals into a high school classroom, there are strategies that educators should consider. Start with small, meaningful experiences that lay the foundation for a well-planned, powerful experience. The Voya STEM Fellows have curated a resource guide for reference, and below we have provided a few tips on gathering STEM professionals and making the most of your time with them to have the greatest impact on your students.

Selecting Speakers

There is a great need for students of all backgrounds to see and hear from role models who look like them from a variety of STEM fields. While sharing stories about notable women and persons of color in STEM (e.g. "Not the Science Type," If/Then She Can) can be helpful, bringing professionals from diverse backgrounds into the classroom to speak with students can have a far greater impact.

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Making diverse role models visible to students helps them to see their own stories reflected and gives them the confidence to pursue their own goals. As guest speakers share their perspective about the world of STEM, what career paths look like, and offer insight to their careers, students become aware of STEM as an ever-evolving field that is continually expanding.

We should also recognize the misconceptions that students and their families might have about the nature of science, technology and engineering and STEM careers. While STEM communities (private and public sectors) have been making efforts to improve the public's understanding of what science and engineering are ("Changing the Conversation" NAE report), all signs point back to the crucial role of K-12 education and how teachers can address these misconceptions.

Preparing Speakers

1. *Don't assume STEM professionals know how to interact with students*. Prepare and support guests. One, well-planned, powerful experience is much better than several 'easy gets'. The SLATE experience at Harvard recommends many things for speaker considerations and highlights that guest speakers truly "provide students a vision of possible career paths."
    - Outline the intended goals you have for your students ahead of time (e.g. Do you want to hear more about their story and how they got there or do you want them to go in detail about a project or experience they have had?);
    - Have them consider providing information that students may not have explored yet, such as life considerations such as insurance, benefits, retirement, and salaries.

2. *Set clear expectations with speakers:*
    - Provide the STEM Professional with tips for talking with students;
    - Complete a planning guide for collaboration so expectations are known prior to the event;
    - Suggest the use of key vocabulary terms;
    - Encourage speakers to share their journey to career and impact on our natural world (with pictures/videos);
    - Support speakers in sharing their own first-hand experiences and stories about their career, and encourage them to share artifacts from their workplace;
    - Suggest to speakers that they share experiences about their own challenges/failures. This makes them relatable to students and makes the STEM profession seem less like "only geniuses" can do it!
    - Be sure to follow district policies for visitors to the building.

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Preparing for Student Engagement

Planning for valuable learning experiences begins with building relationships with students. Building relationships creates routines which provide a success-foundation for visitors to your classroom. In order for these experiences to be effective, an educator might first consider the nature of routines and behaviors they established in their classroom. It's important to welcome new thoughts and ideas, with students primed on how to positively engage with guests, and afforded opportunities to ask questions and have their ideas heard. Additionally, you might consider the following:

1. *Learning about careers should be inquiry-based, not just a 'sit and get' experience.* Plan experiences with characteristics of inquiry in mind - this will allow you to do a better job of sparking students' interest in possible careers paths. As you prepare for a STEM career experience, work *with* the STEM professional to develop a plan for engagement with your students. Take the time to explore what your students would like to know about STEM careers or what they think they may know already. This is a prime opportunity to identify possible misconceptions students might have about the STEM fields!

2. *Understand that some students may not want to pursue the highlighted STEM career.* In this case make sure the speaker experience has breadth and applicability in skills as well as content. Consider the following:
    - What goals do you have for your students?
    - What future-proof skills could they get out of the experience?

3. *Reflect to complete the learning experience!* 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. 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.

Engaging and Empowering Our Future STEM Leaders

In order to effectively accomplish the goal of empowering students to embrace transferrable/future proof skills that cultivate a STEM mindset needed for success in the future workforce, we must consider how to foster thriving learning environments while our students are actively engaging with STEM professionals in our classrooms. Consider these ideas to maximize positive interactions:

- Think about what students will actively be doing while the experience is happening and have several ideas to present to the guest speaker to support their presentation, if needed;

- Consider these questions: What is the role of the STEM professional and the educator? What will each be doing during the activities of the visit?;
- Brainstorm questions for the STEM professional in advance with your class. Students can then reference the questions or actively write down new questions and thoughts. A great strategy to consider is the Question Formulation Technique from the Right Question Institute;
- Ask the STEM professional to use pictures and video as part of the presentation - a personal picture, a story to connect with the students. Personal connections are important!;
- Be prepared! Not all presentations go according to plan. Have a backup plan in case of a no-show speaker or if the session is not meeting your expectations.

These tips are meant to be guidelines from best practices but are not an inclusive list - there are many ways to have successful engagements with STEM professionals. Remember that during the presentation, a sense of flexibility, honesty, humor and fun can make a true difference in engaging students in STEM learning.

Honoring the Collaboration and Keeping the Connection

A post-presentation survey to assess what students learned, what they enjoyed about the event, and where there is room to improve for future events is important. Share the visit on school social media and if school policy allows for it, include pictures of the students and the speaker together. Setting the stage for a continued collaborative relationship with STEM professionals includes providing feedback to them about how the presentation was received by the students, as well as motivating them to consider being a part of future interactions with students. In a reciprocal partnership, educators can help the STEM professional to network with other educators and the STEM professional can help put the educator in touch with other potential STEM presenters. Consider creating an advisory committee to help support your school team in recruiting STEM professionals as guest speakers. Keeping connections with industry partners can lead to future opportunities like internships, jobs, volunteer or shadowing opportunities, and field trips to these workplaces.

The STEM Fellows recognize the importance of bringing STEM professionals into the classroom and have found value in helping students step outside of the classroom walls into STEM career spaces. These connections provide exposure to a variety of STEM career possibilities and can inspire the next generation of problem solvers who have the skills to address the challenges of tomorrow - just take a look at some success stories. For more great ideas and additional support, be sure to view the elementary and middle school STEM Career Engagement Guides.

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