Ruth Fox Middle School: Forces and Motion Community Partner Visit

Context: In the 2021-2022 school year, MiSTEM was able to offer subscription scholarships to Middle School Science teachers using the Mi-STAR curriculum if they were able to engage a community partner in at least one unit throughout the year. Carmen Woodruff, a sixth grade teacher at Ruth Fox Middle School did an excellent job - especially considering this was her first year with the Mi-STAR curriculum! She has continued to engage new partners in different units; below is the story of her first engagement.

Unit overview: 6.4 Forces & Motion (overview of Mi-STAR unit)

How the Community Partner fit into the learning: Students were learning about forces and motion when Bill Barz from L&L Products came in to share about how and why collision forces affected paint on cars. Students were able to see the principles we were learning being applied to a real life situation, and the experience was a great opportunity for them to see that science is not just something that you learn in school. Both Bill from L&L Products and subsequent partners for this unit from Albar Industries (a local shop that paints car components for GM) were able to answer questions and show real life examples of collision forces. I was able to ask questions that were tailored to our learning goals. This helped my students get the most from this experience – they responded really well and have enjoyed the visits!

The first time I had a community partner come in, it was after we had already completed the majority of the unit so I was able to have a good understanding of where the investigation was going; it was my first year both teaching Mi-STAR and my first time bringing in a community partner. I thought this was the best way to make sure the experience was meaningful and appropriate. I was worried my students wouldn't know enough about the concepts yet if I brought someone in early on. I learned that this is not necessary – community partnerships are great and meaningful whenever they can be arranged. Since then I have had partners come in at the beginning of a unit, mid-unit and as a culminating experience, as I have a much better understanding of how the community partner can help my students.

The Process: I had to identify a unit or lesson that would be enhanced by having a community partner come in. I spoke with colleagues to find a partner that would be willing to come in. The district had an existing relationship with L&L Products, so I was given Bill's name, and emailed him a description of what I was hoping for and asked if it was something he would be interested in. We emailed back and forth several times and then progressed to a phone conversation. I had to organize the date, get permission from our principal and inform the appropriate people that we'd be having a guest in the building.

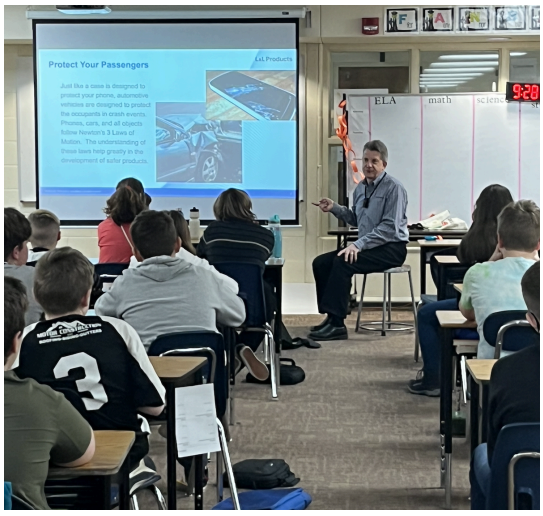
To prepare the students, I had a conversation with them about what to expect. The first time I was nervous as I really didn't know what to expect. I let my community partner know how many students I had, what the room looked like and how I was going to arrange my students in the room. To ask other community partners since then, I've sent cold emails to organizations or relied on knowing someone at the company to put me in touch with the right person.

When I first connected with Bill at L&L Products, we talked about the lessons I was using to teach and my learning goals. He tailored his presentation to include examples of what we did in the classroom and how they connected to real life examples in his field. He brought physical items that the students could see and touch.

When Albar Industries presented for this unit the next year, they visited via Google Meet. They were able to show students car spoilers and talked about how paint had to stand up to rocks on the road, buttons on jeans, garbage bags, etc. The presenter had the kids give examples of how paint on vehicles connects to the real world and why we need to understand how to make it withstand small and large collision forces.

Carmen's Advice: It is key to know your curriculum and how it can connect to the community partner. This will help ensure that the partnership is beneficial to both sides. If you go into a partnership with this in mind, you will match up with someone that will enhance your students' understanding of the curriculum.

Overall:
The community partners enjoyed interacting with the students! They were excited to talk about what they do, and how what we are learning in the classroom connects. The students were happy to have someone from the real world come in and talk about their job. It was a chance for them to see that learning about forces and motions was not just something we do to fill up time in the day, but real life principles that were all around them in their lives, both in and out of the classroom.



<u>Content standards for our Forces and Motion visit</u>

Planning and Carrying Out Investigations*

- Plan an investigation ~~individually and~~ collaboratively, and in the design: identify independent and dependent variables and controls,~~ what tools are needed to do the gathering, how~~

~~measurements will be recorded, and how many data are needed to support a claim.~~ (MS-PS2-2)

PS2.A: Forces and Motion

- ~~The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change.~~ The greater the mass of the object, the greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion. (MS-PS2-2)
- All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must also be shared. (MS-PS2-2)

Systems and System Models

- Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems. (MS-PS2-1)

Stability and Change

- Expectations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales. (MS-PS2-2)