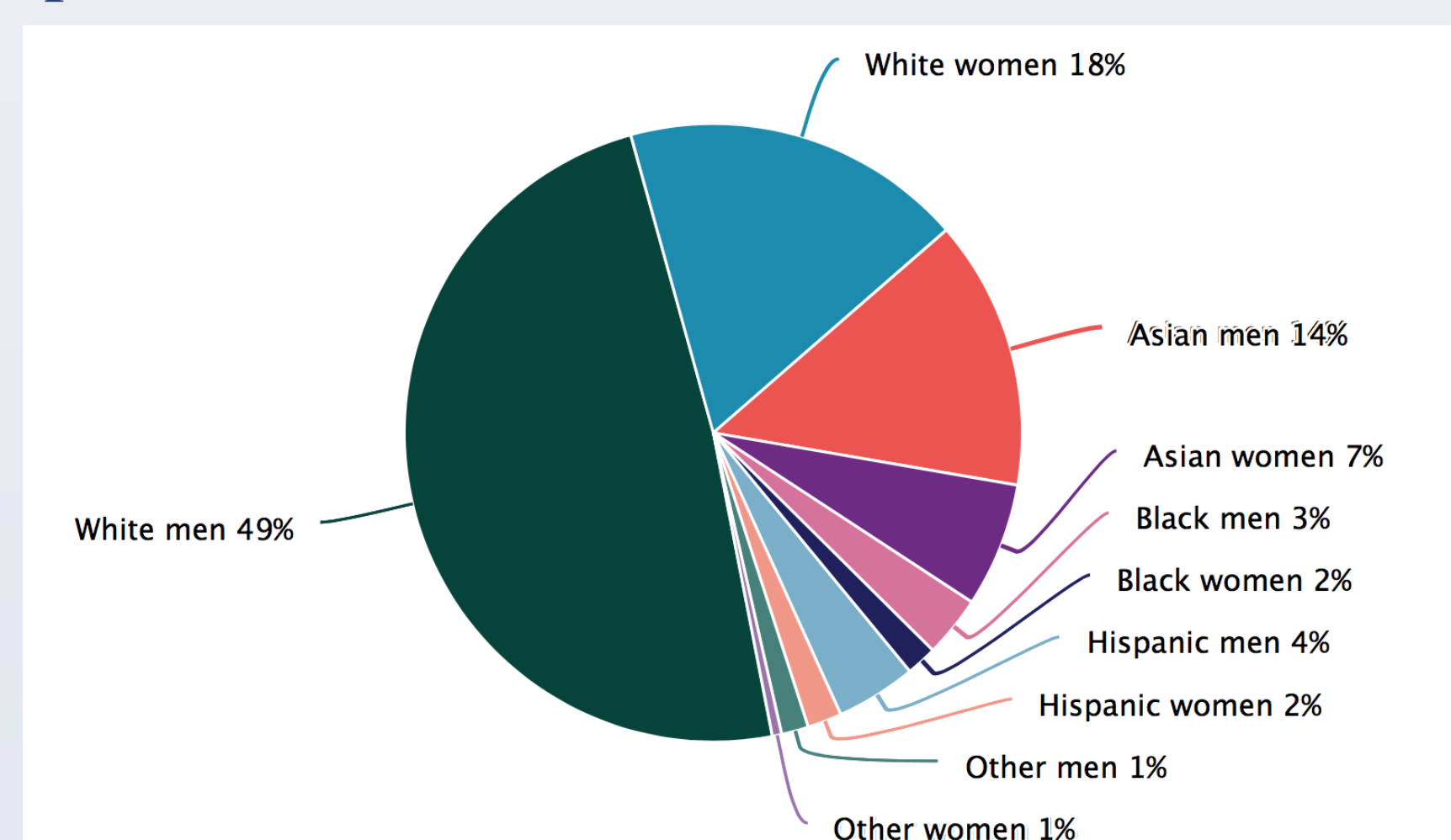


### Background

According to the National Action Council for Minorities in Engineering, "Underrepresented minorities are particularly underrepresented in the fields of science, technology, engineering, and mathematics" (STEM).<sup>1</sup>

A clear breakdown of who is working in STEM occupations is as follows:



### Introduction

STEM fields are substantially under-recruiting minority groups, and that trend begins long before college and career. It starts at home and in schools. Low-income students who may not be able to afford a home computer or home wifi are less likely to develop skills like coding. They lack exposure to primary care physicians, dentists, scientists, pharmacists, and members of the healthcare community at large. Underfunded schools in low-income areas tend not to have the high-priced equipment for STEM learning programs. Students in low-income schools are "much less likely than their peers in wealthier schools to experience hands-on activities in science. More than half miss out on these critical opportunities." They also report that students in the poorest high schools have the least access to science classes and lack science labs and materials for science and math.

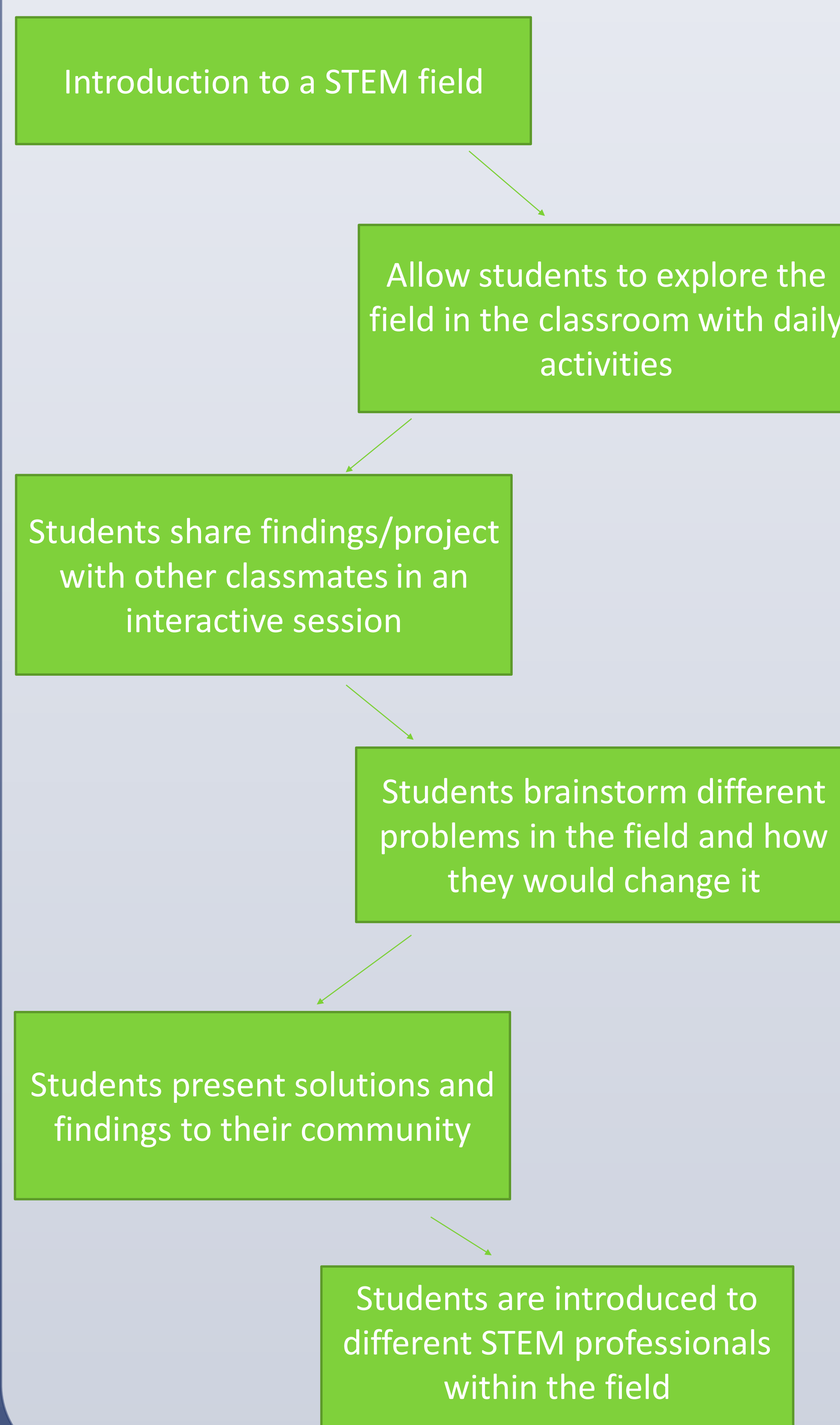
This reality translates to a massive divide between who is seeking higher education and who is not. "If you look at where we admit students who are going to have the most amazing careers you can imagine, you can pretty much map that against a map of the suburbs of regions of the United States which are rich enough to have strong math and computer science programs," stated Andrew Moore, a Dean at Carnegie Mellon School of Computer Science.<sup>2</sup>

### Objectives

- Bring STEM Education and experiences to James Denman Middle School.
- Establish an on-going relationship with the San Francisco Unified School District and James Denman Middle School.
- Allow exposure to different fields and opportunities in STEM that students may not be particularly exposed to.
- Improve awareness of different fields and career opportunities for students at James Denman.

### Materials and Methods

Implementation of STEM educational experiences:



### Conclusions

- Overall students were quite happy and excited to be a part of these classroom experiences. STEM learning is a gateway into a different world for many of these students and they seemingly thrived.
- The key to a successful implementation of STEM activities and a curriculum is school support and an interest by the local community. Ms. Abernethy was key to helping develop a system and a way to implement it for the classroom – and to allow the students to carry the experiences outside of the classroom.
- Two proposed concepts and conclusions I came to find is that perhaps an after school program would be helpful and would allow students a place to come together. I also found that starting small with STEM is key. STEM is about skills and ideas – not necessarily fancy labs and tech.

### References

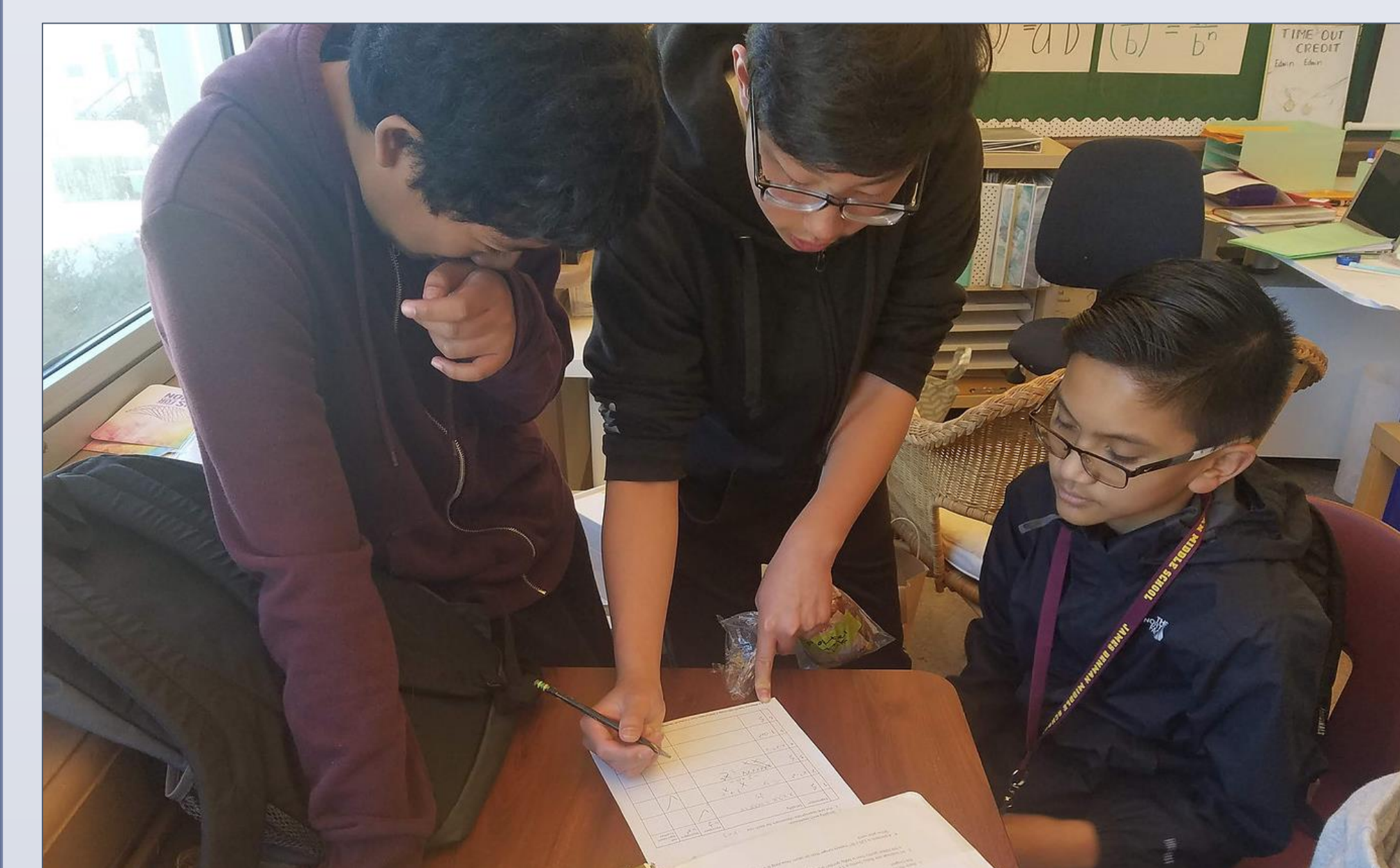
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- Special thanks to Rori Abernethy, Math Club Director and teacher at James Denman Middle School for connecting me with the faculty and students at James Denman, as well as for her mentorship, guidance, and support during this process.
- Special thanks for Dr. Brent Lin for his mentorship and for advising me how to design the project.
- Special thanks to the students at James Denman for their excitement and commitment during this project.

- Prior to the start of the project, 28 students were identified, predominately from underrepresented and low-income backgrounds and were given the opportunity to participate in STEM education activities during their lunch time. The students were asked to dedicate 30 min of their lunch period once a week to this endeavor. This was hosted by the school's Math Club, with the help of Rori Abernethy.

- Class sessions were led via google-classroom and started with a formal teaching session as an introduction followed by interactions among the student to have "their turn" in the experience. Students examined the backgrounds, struggles, and problems that were faced by different members of the STEM communities to achieve their goals of having impact.



### Results

- A total of 28 students participated in the Classroom Stem Sessions.
- All 28 students reported a heightened interest in STEM fields
- 15 students reported lacking proper exposure to the fields brought up in the classroom teaching sessions
- 20 students reported that they would be interested in continuing the program/a similar program