



Minority Student Pipeline MSP

Awarded October 2008 • Strengthening the science pipeline in Maryland



Bowie State University • Prince George's Community College • Prince George's County Public Schools • Towson University • University of Maryland, College Park • University System of Maryland

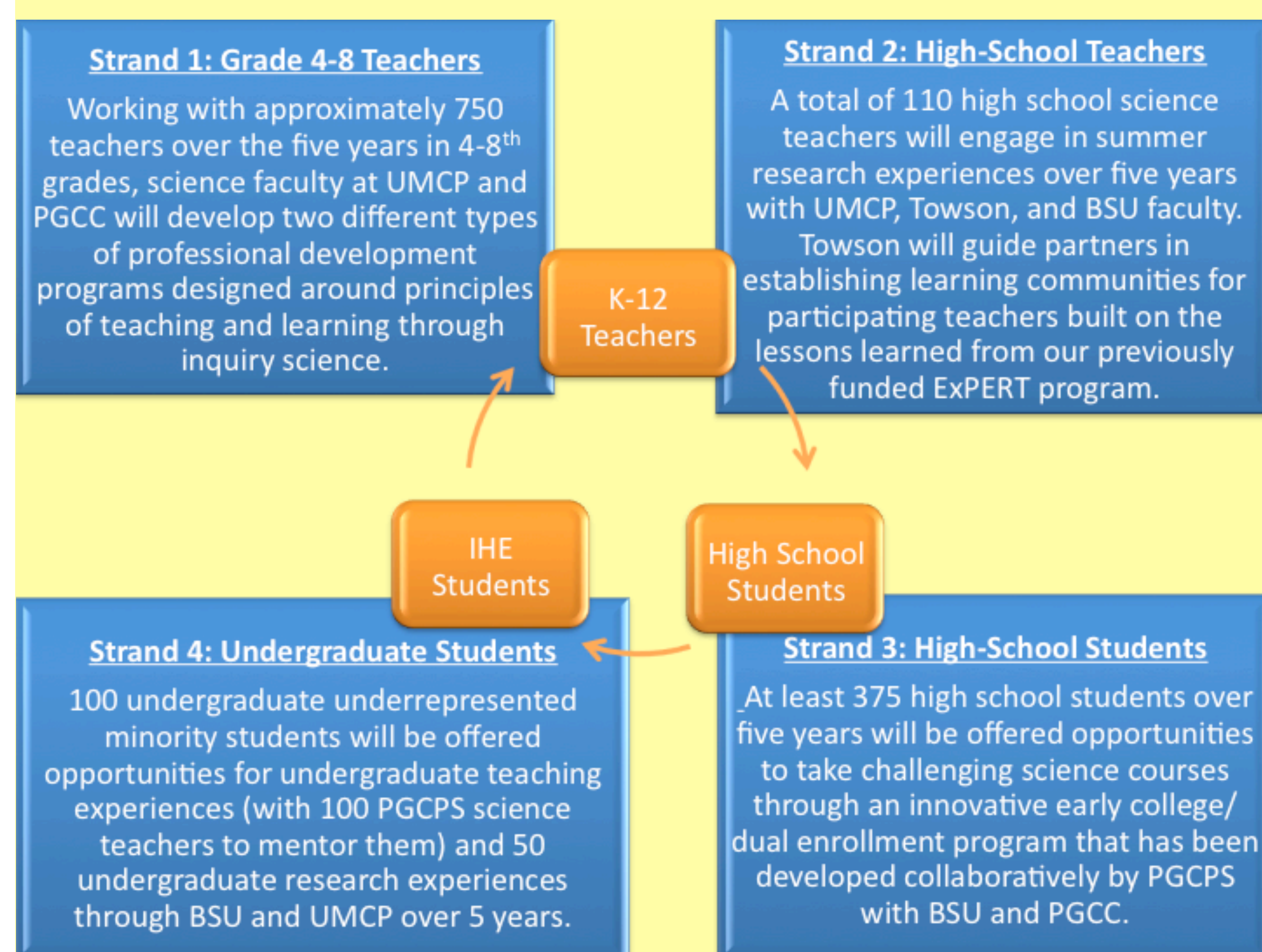
Student success

The primary goal of (MSP)² is to strengthen the pipeline of minority students into science and science teaching. Concretely, this means *increasing the number of minority and other underrepresented students who enter science disciplines*.

Thus, our partnership's operational definition of student success is **entering into one of the science disciplines, including science teaching**.

About (MSP)²

We are in the process of establishing a strong, multifaceted partnership among essential P-16 players in one of the largest majority-minority school districts in the country: Prince George's County, Maryland. Our aim is to expand the minority student pipeline into STEM fields in higher education using four separate strategies involving STEM faculty, targeted at multiple populations (teachers and students):



Teachers of grades 4-8 examine rock samples in a Science Summer Institute.



High-school students enrolled in a college course write the date and names on compost while Prof. Min Fang (right) looks on.



Teachers of grades 4-8 complete an inquiry activity using tuning forks in a Science Summer Institute.



A 4th grader reacts to a classmate manipulating a carbon chain model into a ring structure. The students participated in a Saturday workshop with their teacher.

Partner roles

STEM faculty, alongside K-12 personnel, run all our programs for students and teachers.

K-12 district Science Office personnel provide extensive one-on-one guidance and support for participating teachers and IHE faculty in all strands of our program, and access and analyze student- and teacher-record data with evaluators.

Evaluators work to determine our progress at reaching student-success goals and connect that progress to different aspects of our program.

Research design

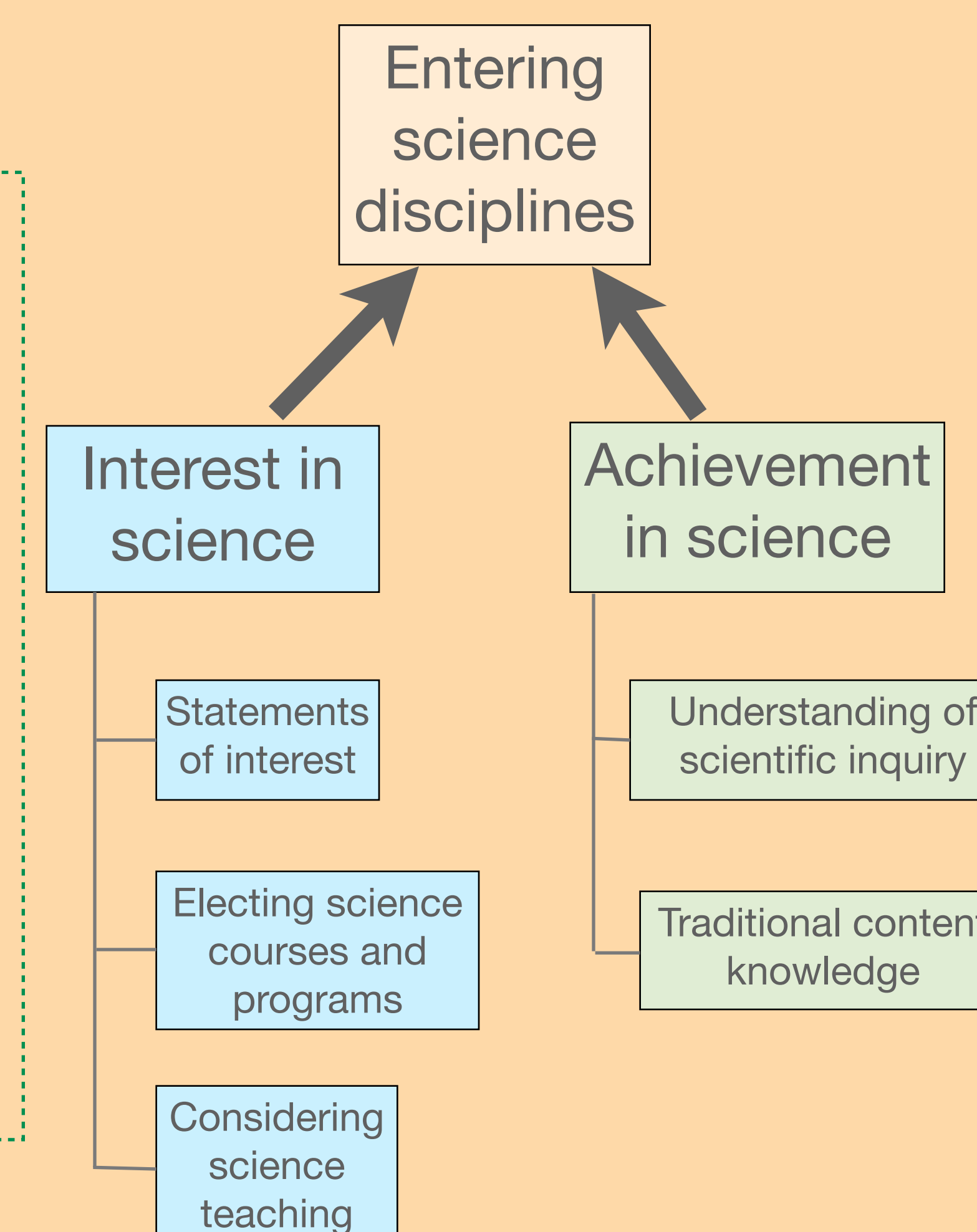
To encourage students to enter science disciplines, the (MSP)² project aims to stimulate student **interest** and **achievement** in science and science teaching. We have a number of specific objectives related to this goal.

Objectives related to student success:

- (1) Increase interest in science among minorities at all grade levels: elementary, middle, high school, and college.
- (2) Improve student achievement in science as demonstrated by engagement in science inquiry activities and on required state science assessments.
- (3) Increase the number of minority and other underrepresented high-school students intending to major in science and entering science degree programs.
- (4) Increase the number of minority and other underrepresented undergraduate science majors considering teaching science as a career.

Related to our target population (minority and other groups underrepresented in science), we chose to **focus on scientific inquiry** for a reason. Inquiry instruction, when done properly, is not only a proven method of improving student learning, but it is also inherently suited for reducing the achievement gap by actively engaging all students.

We are measuring progress on each of these objectives through a combination of student records and transcripts, written survey instruments, interviews and focus groups.



Through these measures, we intend to construct answers to the following research questions, which will help us and others understand how success can be maximized and sustained. Each question is based on one of the four program Strands described at left.

Research Questions:

- (1) In what ways do different inquiry-based professional development experiences and training for elementary and middle school teachers influence their students' interest in science? Are different models of inquiry-based professional development more appropriate for teachers at different stages of their careers? Are different models more effective at achieving different outcomes?
- (2) Do summer research opportunities for secondary science teachers, paired with intentional learning communities focused on the nature of scientific inquiry, lead to enhanced curriculum and greater success for students in science?
- (3) Will opportunities for secondary students to take early college and dual enrollment courses increase the likelihood that students will attend college and choose science majors?
- (4) Will opportunities for undergraduate science majors to teach science lessons in elementary and secondary schools increase the likelihood that science majors will consider a career in teaching? Will early research experiences increase the likelihood that STEM majors will complete science degrees?

Challenges

There are many obstacles for students considering a science career, especially one in science teaching. Many students encounter only limited academic support in college, or perceive that the study of science is too hard for them, and feel like teachers in particular don't get the respect or compensation they deserve. In our project, these challenges continue to surface as obstacles that keep individuals from entering or being retained in science-related fields, in particular secondary science teaching. We have attempted to meet most of these challenges with a number of programs that allow for supportive environments for students, and focused professional development for teachers.

Obstacles to students entering science:

- Limited academic support in college
- Science is "too hard"
- Teachers don't get compensated enough

Meeting the challenges:

- Improving student understanding of science through teacher PD (Strands 1 and 2)
- College courses for students while still in high school (Strand 3)
- Extra support for college students in teaching or research environments (Strand 4)

A challenge we overcame early: Getting access to student data

One reason gathering data from the K-12 district partner was easier for this project was that we went in with a strong working relationship AND were able to secure, in writing, commitments to the data gathering and using processes. In particular, the Chief Academic Officer of the school system signed a letter that granted all MSP partners the status of Agent of the school system. This agreement allows all IHE partners to access and use K-12 data in the same manner as any employee of the K-12 district. In addition, our MSP budgeted for full-time staff housed in the Science Office, including a data and evaluation specialist with a joint appointment in the Office of Research and Evaluation. This gives MSP personnel significant access to voluminous data about students, teachers, schools, etc. **Lesson learned:** get agreements about data access as early as possible and as explicitly as possible, preferably in writing so that changes in administrations don't change the game while you're playing it!

Project leadership

Principal Investigator:

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Project Manager and Co-PI:

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Other Co-PIs:

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