High School Enterprise

What is HSE?
Students are guided by STEM teacher-coaches who have been instructed in engineering design, STEM topics, project management, and teamwork. The pedagogical premise of High School Enterprise is project-based learning framed in the engineering design process. In the course of their HSE experiences, students solve authentic STEM problems, perform testing and analyses, build prototypes, manufacture parts, stay within budgets, write business plans, and manage their own project. HSE teams have program-facilitated access to expertise and mentoring from faculty and students in higher education and from professionals in industry. Most operate as afterschool activities, but we do have in-curricular implementations. When the coaching of an HSE team falls outside of the normal duties of a secondary teacher, the teacher-coach receives a stipend for his/her coaching efforts—just as an athletic coach would.

Based on results from our pilot study, we expect that at the conclusion of their High School Enterprise experiences, students will be prepared to undertake the education/training needed for STEM careers and will be more disposed to select those pathways.

In short, the overarching goals of High School Enterprise are to motivate, prepare, and help students to pursue post-secondary STEM education and STEM careers.

“My hometown is Galesburg, Michigan, which could cause many of you to scratch your heads and wonder, ‘Where is Galesburg?’ That’s the point. Even though it was in a small town, my high school’s focus on STEM gave me and my fellow graduates opportunities far beyond what I, a farm boy, thought was possible. Preparing our high school students to pursue post-secondary education and training in STEM fields is crucial to the economic and social future of Michigan and our nation. Michigan Tech’s High School Enterprise program is a great way to get diverse groups of students excited about and involved in STEM, and will help prepare young people to lead the future as STEM professionals and innovation leaders.”

— Rod Smith, IBM Fellow and Vice President of Emerging Technologies at IBM

Get Involved
Support of High School Enterprise allows Michigan Tech and partnering institutions in K-12 and higher education to implement learning in ways typically unavailable to K-12 students. HSE aims to expand the pathway into STEM postsecondary education and careers with emphasis on underrepresented groups. You can help by pledging your support to the program in several ways. Support a team at a school near you, support the outreach efforts at Michigan Tech, or both. Please contact us to discuss options.

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Educational Reflection Garden
Team Name
DIPLOMATS

School
Arthur Hill High School, Saginaw, Michigan

Teacher/Coach
Celeste Conflitti

HSE Showcase Participants
Amanda Benton, Torion Franklin, Thelma Hatter, Jazmonique Jones, Jasmine Curry Wilson, Kailan Fuller, Shanyi Holloway-Evans, Teahondra Stinson, Johnny Dukes, Jordan Hais, Anquavion Howard, Richard Walker

Sponsors
National Science Foundation, and Bernie Conflitti, community supporter

Project Overview
The DIPLOMATS are designing, creating, and constructing an educational reflection garden to host flora as well as area wildlife. The multi-acre parcel, situated on school property, is being converted into green space that will not only feature Michigan species but will utilize solar, water conservation, and composting concepts. Additionally, we will produce grade-level lesson plans to assist teachers in developing biological and environmental educational skills and lessons.
"I can’t get them to go home!"

"It’s not your run-of-the-mill student project. It’s over and above what students usually encounter—something fun and different. A lot of learning goes on."

"It’s not the same as a classroom setting."

"I didn’t have until I was in college. They are doing college work."

"HSE is all about getting kids interested in science and math, making it fun, interesting and exciting—it’s not the same as a classroom setting."

"The biggest part is the technology. My daughter has a basic idea of how to wire and program that I didn’t have until I was in college. They are doing college work."

PARENTS SAY:  
"HSE is all about getting kids interested in science and math, making it fun, interesting and exciting—it’s not the same as a classroom setting."  
"The biggest part is the technology. My daughter has a basic idea of how to wire and program that I didn’t have until I was in college. They are doing college work."

TEACHERS SAY:  
"I love watching these kids take pride and ownership in their projects."  
"It’s not your run-of-the-mill student project. It’s over and above what students usually encounter—something fun and different. A lot of learning goes on."  
"The long-term nature of the projects allows students to work through problems and fix things that have gone wrong, an experience they often don’t get in the classroom."  
"I can’t get them to go home!"
“The project is OUR choice, not given to us. It’s important for us to do it well.”

STUDENTS SAY:
“We are able to learn from our mistakes when things don’t go well. In a regular class, we just get marked down. Here, we really learn!”

High School Enterprise

Alternative Energy Transportation Innovative Vehicle Design

Team Name
Cyber Cards School
Makendikle High School, Makendikle, Michigan
Teacher/Coach
Randy Thomas

HSE Showcase Participants
Mohamed Akhdadli, Andrew Barron, John Felt, Brandon Foster, Angel Gargarillo, Jose Gorgulca, Jonathun Gunthar, John Hamilton, Hamas Hussain, Damali Lopz, Zachary Obumor, Elsany Rodriguez, James Towley, Jeff Turkel, James Vanover, Draughun Walker, Dillon Zaleski

Sponsors
National Science Foundation, Square One

Project Overview
Students researched the topic of innovative vehicle design and its applications in the automotive industry. They researched applications of lightweight alloy materials for inner structural support for the vehicle. They also examined role reconfiguration within our electrical system to increase the efficiency of the vehicle. The students also conducted research projects on: 1) quality application programming skills.

Wireless Communication and Technology

Team Name
Wireless Knights School
Oak Park High School, Oak Park, Michigan
Teacher/Coach
William Grimm

HSE Showcase Participants
Joseph Spar, Claire Brown, Marquise Womack, Mary Achapsampong, Charlie Walker, Anthony Smith, Kyiaa Dawson, Maya Trigg

Sponsors
National Science Foundation, Square One Education Network

Project Overview
Students are investigating cell phone technology and the science behind wireless communication throughout the school year. They will spend six weeks in the summer developing a cell phone application. They will develop a business plan where they will research the market for this application, target audience, and ways to reach them. This application will be programmed and developed by the students in order to meet a current or future niche in the application market. In the future, this group of students will teach incoming underclassmen these cell phone application programming skills.

Scan-N-GO! Student School Locker

Team Name
Student Product Development School
Tahk High School, Atlanta, Georgia
Teacher/Coach
Hien Luong

HSE Showcase Participants
Dolovita Dixon, Kristopher Davis, Quanesha Perkins, Ibrahim Carson, Yi-Neidy Calix-Chungin, Ronald McCullough, Jasmine Williams, Courtney Roscoe, Corey Goss

Sponsors
National Science Foundation and Georgia Institute of Technology

Project Overview
We are designing and fabricating a prototype for a product we think will be very useful for students all over the country. Using the engineering design process, we have developed the Scan-N-GO! technology, which integrates a typical school locker with up-to-date security measures. This swipe-card system will be an elegant and time-saving product that schools and students will find very useful.

Underwater Remotely Operated Vehicle (ROV) Engineering and Aquatic Science

Team Name
Traverse City ROV Engineering School
Traverse City Central High School, Traverse City, Michigan
Teacher/Coach
Keith Fortho, Traverse City Central High School; Than Dykstra, Traverse City East Middle School; and Dr. Norton Brotz, Three Lakes Association

HSE Showcase Participants
Colton Gubler, Kristin Adams, Chris Hall, Kate Cooney, Dan Medion, Emily Lefldord, Alton Manus, Darin Suchan, Patrick Koro, Megan Kril

Sponsors
National Science Foundation, Square One Education Network, and Traverse City Area Public Schools

Project Overview
Currently little opportunity exists for engineering projects in the maritime environment, especially at the high school level. The marine and submarine environments truly offer unique engineering challenges that are not addressed in the terrestrial world. Goals include: (1) Increase the use of technology in both the ROV system and the building process. (2) Design, engineer, build, and evaluate an ROV that is capable of reaching a depth of 200 feet. (3) Provide a service utilizing ROVs to the surrounding community. It is the vision of this project to create a unique engineering challenge that will allow students to put science, technology, engineering, and mathematics (STEM) into practice within the engineering processes.

Conversion of Car to Autonomous Vehicle

Team Name
Ui-Prep Enterprise School
University Prep Science and Math High School, Detroit, Michigan
Teacher/Coach
Nicholas Fall

HSE Showcase Participants
Benjamin Nelson, Kayana Johnson, Kevin Johnson, Jason Wozniak, Ikthyia Jordan, Deva Camie, Ralph Brinson, Krist Logan, DaAndra Gray, Tiarra Johnson

Sponsors
National Science Foundation, Square One Education Network

Project Overview
Students at University Prep Science and Math (UPSM) High School have chosen an ambitious project that focuses on converting a Power Wheels jeep into an autonomous vehicle. The team has had to develop skills in electrical, mechanical, and systems engineering to work through this project with different sub-teams focusing on different areas of the project. This project is part of the Square One Education Network’s Autonomous JD Program.

In addition to designing and building the vehicle, this enterprise focuses on documenting its work, and is reaching out to local middle and elementary school students to engage and excite them with STEM-focused activities.

Earthquakes: Science and Society

Team Name
U.C. Woodlawn Blueprints School
University of Chicago Woodlawn Charter High School, Chicago, Illinois
Teacher/Coach
Assala Moore

HSE Showcase Participants
Sharmake Chickle, Afuwa Gwain, Brianna Anderson, Dione Boyd, Kannasay Hicks, Danni Harris, Darylyn Hinton, Montay Tucker, Tamiesa Robinson, Adriana Jenkins, Paul Callou, Marquise Tucker, Issa Brown, DaShawn Julian, Justice Benjamin, Gerard Greninger, Michael Bronner, Mallc McMillon, Kenneth Pandall, Danni Morris, Jennifer Davis, Ti-Ala Simmons, Brianna Hckdn, Priscilla Agbo

Sponsors
National Science Foundation, Michigan Technological University

Project Overview
Using STEM principles, we will investigate the catastrophic impact of the 2010 earthquake on Haiti, as well as how to rebuild and consider steps to prevent future devastation. We will build a shake-table to simulate earthquakes and test scale models of buildings.

More generally, our team is committed to answering these four essential questions: (1) How can STEM help people of African descent improve their communities? (2) How have African contributions to STEM evolved over time? (3) How can we use STEM to prevent future devastation such as the Haiti earthquake? (4) How will we use non-STEM disciplines to enhance our team’s success?
Thank you to all of our partners!

- Michigan Technological University
- General Motors
- National Science Foundation
- Georgia Tech
- IBM
- AT&T
- Square One Education Network
- Universidad del Turabo
- ASME

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