UNIVERSITY OF CHICAGO
CHARTER SCHOOL –
WOODLAWN CAMPUS (UCW)

Chicago, Illinois
High School Director: Assata Moore
Project Leads:
Dennison Cordell and Benitta Jones
Project Assistants: Dashawn Julion and Benjamin Justice
UCW Mission

The University of Chicago School of Research and Design cultivates students innate ability to imagine, analyze and create so that they become innovative agents of positive change in an increasingly technological and global community.
There are 21 students enrolled in the Introduction to Engineering course at UCW.

Students grades 9-12 are enrolled in the course.

Two 12th-grade students serve as a Teaching Assistants.
UCW Engineering Students
Introducing the “M.P.K.B.L”s

- The UCW–HSE team name is the acronym “M.P.K.B.L. (pronounced “impeccable”).
- M.P.K.B.L. stands for Math Provides Knowledge Beyond Logic
The purpose of the Engineering Course is to introduce students to the fundamental skills needed to be a successful engineer. These skills include knowledge of the engineering process, teamwork, and communication skills.
The team has built several robots using the LEGO NXT software.

Students plan to use some of the models built as a base for their HSE project and build upon them to enhance their functionality.

In addition to building robots, students have engaged in additional design challenges such as designing and building:

- Rube Goldberg machines
- A cardboard chair that can support a person up to 240 lbs.
- Marshmallow Tower Challenge
Our strategy for designing our cardboard chair was to create a sturdy chair out of pure cardboard that would hold the weight of 250 pounds and possibly more. We began with creating a steady base with the use of slits in the side of the cardboard so that it wouldn't require the use of glue and/or tape. We believed that our design would be sturdy because it was well thought out and we had a lot of cardboard. Our chair did not work and it began to fall apart when tested. To improve our chair we could have gotten better grades of cardboard. I do not think that our chair could be sold in a store as it is because it wouldn’t be able to hold anyone let alone stay in one piece. With better materials I believe that it could sell in a retail store for a low cost because I don’t think that there are many people that would buy a chair made of cardboard.” Jalela M.
Student Testimonials

- “In the Engineering Class, I learned how to communicate with classmates while building and programming a robot. I also learned the steps needed to complete an engineering project.” – Dennis T.

- “I enjoy building robots because it is a hands-on activity.” – Jalela M.

- “I enjoy learning how to program robots using Lego NXT” - Jerrissa H.
At the beginning of the project planning period, students attempted to build a robot that can detect a shoe that is not black. The robot could be used to detect uniform policy offenders at schools such as UCW that have a black shoe only policy. Students realized there were too many variables to consider to make the Black Shoe Detecting Robot a feasible project.
Students are learning how to build and program LEGO robots using NXT software this year.

Before starting their HSE project, they completed several LEGO/NXT builds to familiarize themselves with the software.
Pictures of Early Robotics Builds
Students are building 3 different robots. Each robot is designed to help humans with tasks such as:

- Alarming patrons in a library if the noise level is too loud.
- Alerting security in a office building if a door was left open.
- Inspecting a mine shaft for potential dangers.
Students are working in groups of 4.

Each group member was assigned a primary area of responsibility. The areas are:
- Writer
- Programmer
- Builder
- Spokesperson/Researcher

The HSE project teams were given 6 weeks to complete their projects.

Students began working on their new project plans the week of January 21st. It is expected they will complete their projects the week of March 8th.
Challenges and Solutions

- It was a challenge having students fully participate in the robotics project daily because only one person could do the hands-on building at a time. Similarly, only one person could program (even though all students were expected to help.)

- To overcome this challenge, students were assigned roles within their group so that they could work on different tasks simultaneously.
Students will work on building, programming, and testing their robots.

Mid-March students will work on completing project boards to accompany their robot.

Our goal is to have at least 3 fully functioning robots to showcase at the HSE Expo.

Students will expand their knowledge of robotics by programming in C+ and participate in the Chicago Area Botball competition.
Future Plans for Presenting Work

- Engineering students presented the Beta version of the mining robot at a middle school science fair. Middle school students were excited to see the type of work they could possibly do in a high school engineering class.
- We plan to continue to showcase the projects students are working on via presentations in the science classes at our school.
The UCW Engineering students thank Ms. Moore, our High School Director, for all of her advise, leadership, and support.