

## SSW 2. SPIRIT IN ACTION (PICTURES)



Students working with the engineering process to come up with a design to better the robot.



Students displaying their engineering notebook drawings and plans.



Teachers learning how to use the electronics equipment before they build the robot.



Teachers learning to drive their robots and having a bit of an impromptu robotic Sumo competition.



Teachers working together on their robots.



A teacher works on adding some resistors to a circuit board.



Three students investigate how the circumference of the wheel is related to the distance traveled.



Students investigate the formula for distance = rate x time.



Students investigate the relationship between the circumference of the wheels and the distance traveled upon various wheel rotations.



Students investigate the formula for distance = rate x time.



Students exploring the capabilities of the CEENBoT in a series of testing trials.



A student takes notes for future reference on the workings of the robot.



These students check the LCD for important data they have gathered.



These three students are gathering data from driving experiments they have conducted.



A student manipulates a virtual CEENBoT through an obstacle course.



This student is using a chain to see how much a weight a robot can pull with a pulley system.



The students construct a maze for the robots out of everyday materials.



A student examines angle of incidence options for a CEENBoT bump course.



The CEENBoTs and drivers follow the path through the maze.



A student tests advanced drive functions they added to the CEENBoT.



A teacher examines GPS coordinates of CEENBoT locations with his students.



Instructors give detailed directions in the use of the CEENBoT to a group of teachers.



Dr. Mitchell shows students how to make a small robot work with lemon batteries.



A student tests his driving abilities with the CEENBoT.



These students test each others driving skills and learn the controls.



Other robots are used to test the skills of students on momentum and force.



A group of students examine algebraic slope of a stalling robot up a ramp.



These students are modifying their CEENBoT for an experiment.



A physics teacher helps students understand gear ratios.



Teachers work together with the CEENBoT Commander programming interface.



Teachers investigate the new mechanical arm on the CEENBoT.



Teachers brainstorm on ideas for using the CEENBoT in their classrooms.



A couple of students investigate the new single-board CEENBoTs.



CEENBoT Parking Garage



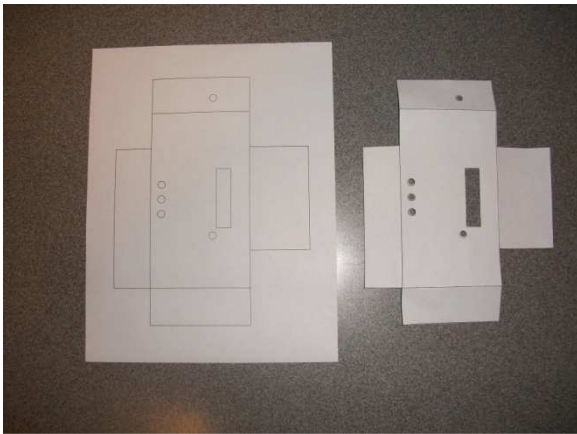
CEENBoT Charging Station



Cardstock prototype design for plastic shell of CEENBoT.



Front view of cardstock prototype design for plastic shell of CEENBoT.



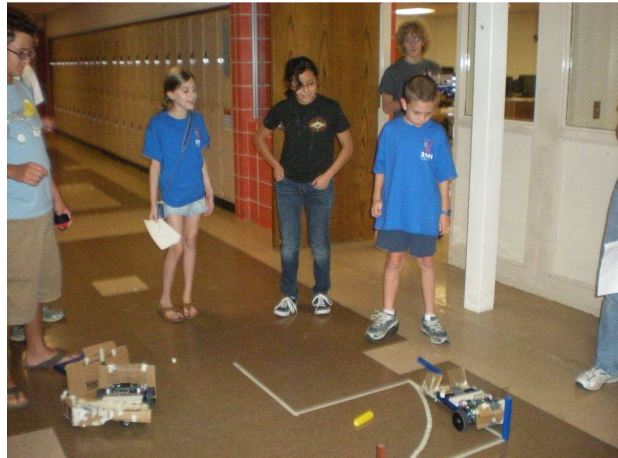
Cardstock design template for CEENBoT plastic shell.



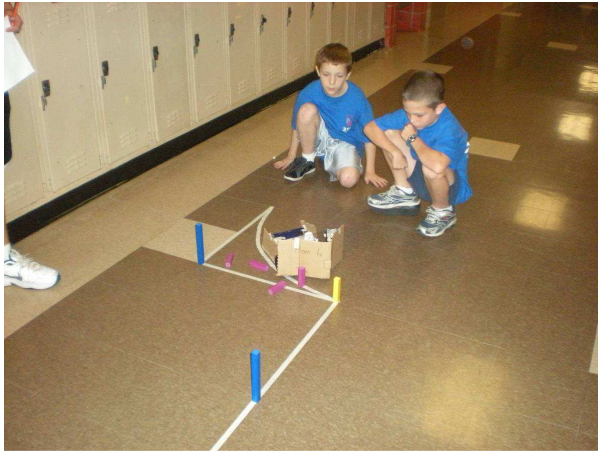
Modifying the robot for the soccer and programming challenges.



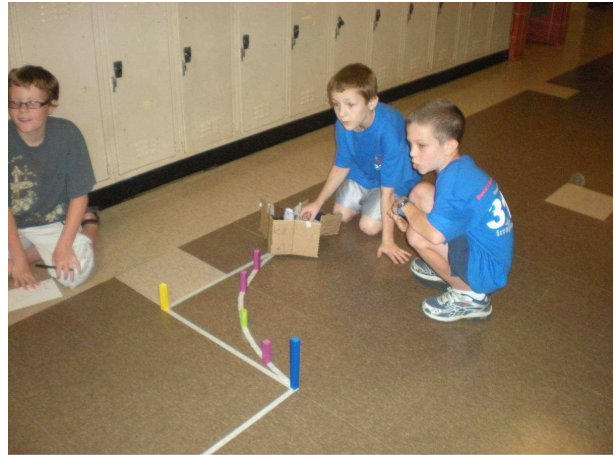
Programming the robot with the CEENBoT Commander development environment.



Testing the robot programming.



Programming the robot to follow a curved path.



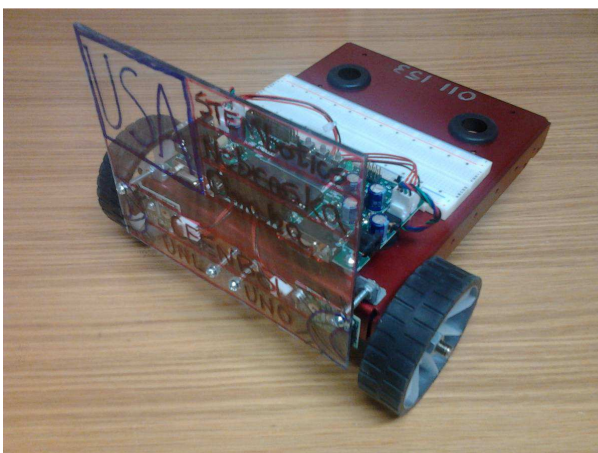
Robot programming challenge illustrated a modular design approach.



A robot modified to carry a video camera phone.



A soccer challenge stressed modification of the robot.



Shield modification used during the summer field test.