

MASTER/STEP Summer Program
Herbert Lehman College, CUNY
Bronx, NY
Course: Electronics
Instructor: Howard Stern

Electronics is designed as an introduction to a few of the topics that shape our information age, with particular attention to the interaction between humans and computers. The curriculum begins with an overview of electricity and electrical components. Students are introduced to Adobe Flash computer software as a means to create animations. Then extensive coverage is given to programming an Arduino micro controller board to interact with the environment.

The first week began with experiments with air. Because electricity is made up of something we can't physically touch, we explore some properties of air which direct analogs to electricity. We explored the time involved in blowing up balloons under a variety of conditions – through small straws, through larger straws, etc. This helped give a kinesthetic understanding of the idea of resistance in electricity.

The next few days were an introduction to electrical circuits. We worked with voltage sources (batteries and computer USB cables), conductors, LEDs, resistors, and breadboards. Students built and studied series circuits and parallel circuits to understand the properties of each.

Week 1 ended with a workshop on Adobe Flash. Students learned the basics of the stage, working with a timeline, previewing work using the play head, building animations in layers, keyframes, and tweens. They produced a short animation of a school bus rolling across the screen.

During week 2, students built and programmed circuits using the Arduino microprocessor board and the Arduino programming language. Students designed circuits, routing signals from up to 16 digital inputs and outputs and up to 6 analog inputs, and programmed the board how to use the signals. Students developed skills in reading schematic diagrams, programming language flow control, and debugging.

At the end of the course, successful students have a basic understanding of electricity, reading circuit diagrams, high-level computer programming, and Flash animation.