Fearbots
Capstone Project on Mary Shelley's *Frankenstein*
Shared by: Sue Fisher, EurekaLab Instructor, Meadowbrook School, Weston, MA

Specialized tools/technology used	Experience level required
Hummingbird Duo, Adafruit Robot Chassis, AA Battery packs for Arduino	None
Software: Arduino & Ardublocks for Hummingbird Duo	Competent using a computer for other school work; no other prior experience.

Grade Level (of this example)**:** 8th   **Time:** 9 classes, 45-50 minutes each

Content Standards (of this example)**:**
- **ELA** - creative writing, literary analysis
- **STEM** - robotics

Summary of Project:
During a unit on Shelley's *Frankenstein,* students were given this prompt: "Explore your own fears and create autonomous robots that demonstrate or represent those fears."

Students worked individually to design robots, build them, and then write a story about their monster. During robotics work periods, students helped each other answer questions and debug programs. As they worked, they entered a daily reflection, complete with writing and a photo, into a shared document. At the end of the project, they shared out their work with their classmates.

Student Work
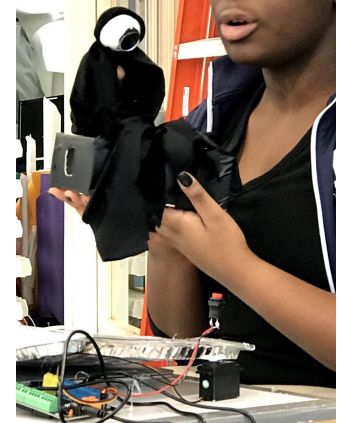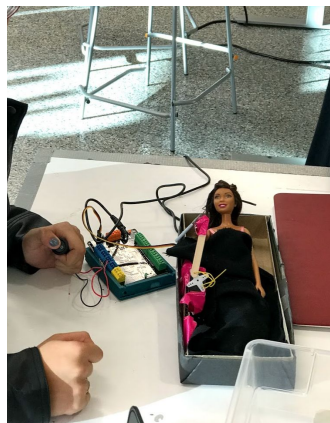
You tube video compilation: https://www.youtube.com/watch?v=KEHfYPLToqc

Notes from contributor

Before starting to design their robots, the students first saw some examples of things that robots can do, and were given a description of the project. They were asked to sketch a diagram of their idea on paper, and then fill out a survey where they were asked to describe their idea and name which parts they would need. The diagrams went into their personal daily reflection document.

Parts & supplies were ordered based on the responses to the survey. About two weeks later (after a class trip was completed and they'd read more of the book) they began the project. Reading of Frankenstein & daily questions about the text continued as homework.

9 classes, 45-50 minutes each. (1 introduction & idea generation, 5 classes with mini-lessons to learn the software and hardware, 3 work periods to build individual robots, 1 share out period)

Students own their own laptops but had no prior experience with Arduino nor robotics. Most had done some drag/drop programming via hour of code or Scratch. Only 2 out of 22 were proficient with robotics, having attended weekend robotics classes at MIT.

Most students did not create an abstract monster to represent their fear but concrete images: a mushroom cloud made out of cotton balls and lights to represent a fear of nuclear war; a diorama where they are a character in a situation that they dread, ie drowning, making a wrong decision, or feeling boxed in by peer pressure.

Suggested resources

- I created a help wiki with how-to docs available there. The info there correlated to the mini lessons taught so that students who were absent could catch up and it could be used as a reference site after the lesson was presented. Often students worked independently through the instructions so that they could proceed at their own pace. Help was available during study hall for those who needed more help or technical assistance.

- Hummingbird duo website has good examples and teacher help with wonderful tech support and fast response time. their business is focused on students and teachers.
  Some limitations to be aware of:

  - Hummingbird Duos don't supply a chassis, so I used the Adafruit round one and it worked well. We installed Ardublocks using their instructions. Instructions for using it with the Hummingbird Duo are here.

  - Sound wasn't available on the Hummingbird Duo - we used some small mp3 player bluetooth speakers instead, but they're not linked to the robot in anyway and are not

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programmable. Alternately, the Adafruit circuit playground has a small speaker built-in.

- ○ Hummingbird Duo doesn't supply push buttons or on/off switches, so I made some by soldering [wire](#) to [these](#) and [these](#), provided a 100K ohm resistor, and wrote [instructions](#) for the students.

Video samples:

https://photos.app.goo.gl/oN4H0xDxwcJvDOwy2

https://photos.app.goo.gl/wEnDYFgbZ46JTY4x2

https://photos.app.goo.gl/0eA76TGo4v5FU4xk2

https://photos.app.goo.gl/E4Sj6LF7khxaF7502

https://photos.app.goo.gl/Zt0AX8g9IqjVILTs1

https://photos.app.goo.gl/bituFf8ypKAzJX4g1

https://photos.app.goo.gl/tTiPMLNaghh5lYIC2