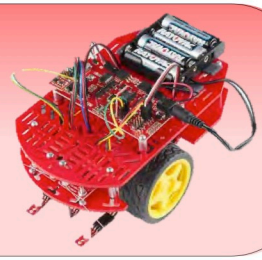
Become A Robotic Expert Easily

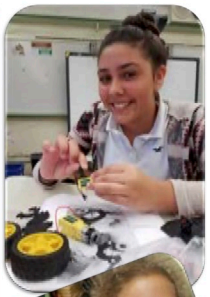
Dr. Suzanne Banas, NBCT

South Miami Middle School, Florida



Learning Goals:

This project is a great way to get students' feet wet in the world of robotics. The project is designed to introduce teachers/students to the various ways to code a robot beyond drag and drop. Using motor robotics and sensor integration this modular robotic development platform works with the Arduino IDE for teachers/students to easily program with written code to command various motions. The Robot Dance Party is designed to provide an engaging way for students to demonstrate mastery of the various coding programs through creating "steps" motions of a "dance" and/or code the song. The Robot Dance will be video recorded with the music and shared with others.



Project Description:

The RedBot is a modular robotic development platform that works with the Arduino IDE. The RedBot is a motor driver and Ardiuno combination with various headers and connections to get desired functions. The students will simply connect a USB mini-B cable, and they will be able to program it in the Arduino IDE using the example code, and then their own. The students will have a guide that will go through nine different experiments, ranging from learning how to drive your RedBot to using an accelerometer to trigger your RedBot to move. Working in pairs the students can pick and choose as they feel the need to complete their own Robot Dance. Since coding is new for many students and very few have coded, some have cognitive/ learning disabilities, Once they have mastered the desired experiments and coding, the students can take what they've learned and apply it to creating the Robot Dance video.

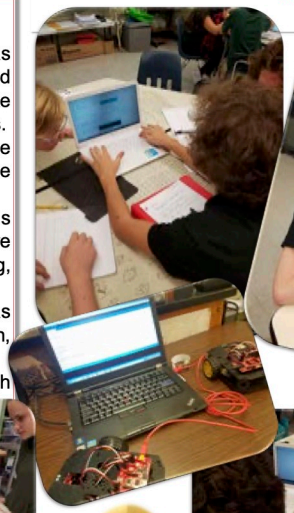
For the Robot Dance Party, the students will need to program the "steps" (movement) to a song (whether pre-made or they code their own) and video tape it to share.

Assessment: Students will program the "steps" (movement) to a song (whether pre-made or they code their own) and video tape it to share.

Robot Dance Party

Objectives

- Collect real-time data from sources such as simulations, scientific and robotic sensors, and device emulators, using this data to formulate strategies or algorithms to solve advanced problems.
- Describe major applications of artificial intelligence and robotics, including, but not limited to, the medical, space, and automotive fields.
- Describe a software development process that is used to solve problems at different software development stages (e.g., design, coding, testing, and verification).
- Explain that computers model intelligent behavior (as found in robotics, speech and language recognition, and computer animation).
- Explain the notion of intelligent behavior through computer modeling and robotics

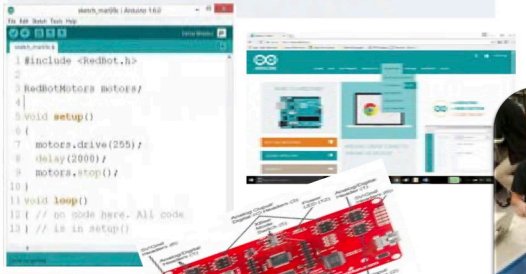


Install Arduino IDE

In order to get your RedBot up and running, you'll first need to download the newest version of the Arduino software from www.arduino.cc This software, known as the Arduino IDE (Integrated Development Environment), will allow you to program the board to do exactly what you want. It's like a word processor for writing programs.

***If you are not familiar with Arduino IDE then ask for support or please visit the Installing Arduino IDE tutorial for step-by-step directions on installing the Arduino IDE on the Sparkfun site or Arduino.cc site.

Intro to Arduino



Experiment List:

Here is a breakdown of each experiment presented in the Redbot tutorials. https://goo.gl/vhoaDY

Students can do them in order or jump to a section, or continue reading to learn more about the hardware and library before starting on Experiment 1.

1. Software Install and Basic Test
2. Drive Forward
3. Turning
4. Push to Start & Making Sounds
5. Bumpers
6. Line Following with IR Sensors
7. Encoder
8. Accelerometer
9. Remote Control

Each experiment tutorial provides:

- description of experiment
- example of code/sketch to copy into coder (Arduino.cc software)
- what the Arduino circuitry board looks like
- going further
- other related experiments
- write your own sub-routine
- data table
- trouble shooting

SparkFun Inventor's Kit for RedBot

sparkfun

What is a robot?

Ask a bunch of robotics experts, and you will get a bunch of answers. Instead let's ask, what is robotics technology? Robotics technology consists of machines that can:

- Sense - Sensors, or feedback devices, allow information about the machine's surroundings to be recorded as electronic values.
- Think - This electronic data is then used in complex circuits programmed to produce signals at the other (output) end of the circuit.
- Act - Acting is the most obvious part of robotics technology. The electronic signals that were produced as a result of sensing and thinking then control whatever the robot is designed to do, like lift a sick person, make a facial expression, or control the motors that allow it to navigate around an obstacle.