Incorporating Sensors in the Classroom

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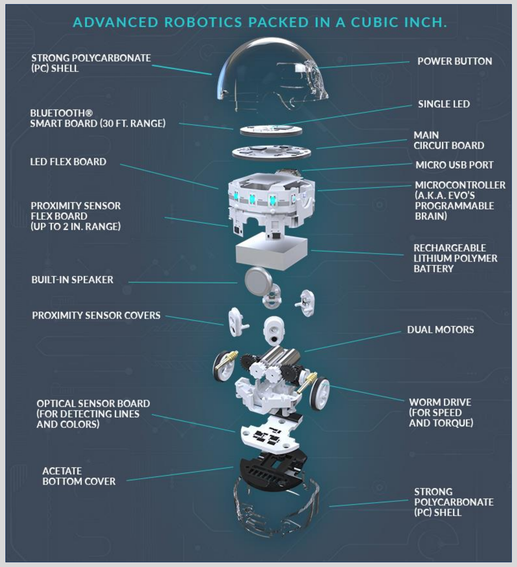
Introduction and Justification

"Whether you want to uncover the secrets of the universe, or you just want to pursue a career in the 21st century, basic computer programming is an essential skill to learn."
~ Stephan Hawking

Learning how to code and incorporate sensors is a vital part of understanding how robots work in the 21st Century. Ozobots are simple to use and easy to program robots that offer multiple sensors and can keep the interest of students. They are also extremely versatile in how they are able to be programmed and offer different levels of coding for students depending on their ability. Students use Ozoblockly.com to formulate their code. The website features five different modes for students (Novice, Beginner, Intermediate, Advanced, and Master.

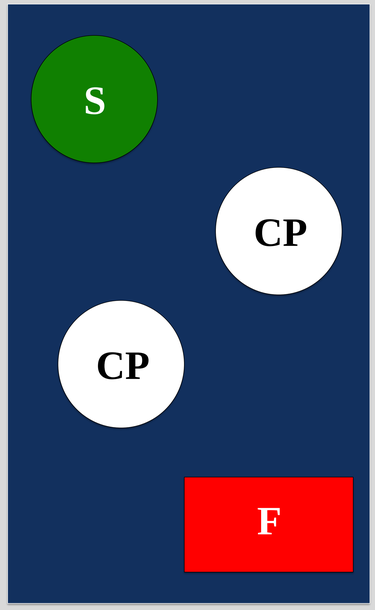
The Ozobot incorporates two different types of sensors for the students to explore. On the front and back are Proximity Sensors with a two inch range. On the bottom is an Optical Sensor for detecting lines and colors. Using sensors to engage students is ideal because students can easily relate to using their own senses. Also, by using such a visual stimulus, it allows learners of all types to engage with the robots.



Assessment

As a final challenge for the students, they will formulate code for the Ozobot that uses only sensors. The bot starts at a given location (S), reaches two checkpoints (CP), and finishes in a given area (F) in 60 seconds.

In order to have successful code, students will have to combine all of their knowledge from previous lessons and activities (i.e. debugging, loops, and logic).



Activities

Activity 1: Students use the proximity sensors on the Ozobot to navigate a given distance and perform a task when an object is reached (e.g. play a sound effect, change color, spin, etc.).

Activity 2: Students build upon what they learned and did in Activity 1 by beginning to formulate code to navigate around an obstacle.

Activity 3: Students continue to build upon their knowledge from the first two activities and now incorporate loops into their program.

Activity 4: Students now formulate code that moves only using the sensors.

For more information about this project

Tinyurl.com/OzoSensor

Standards

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

W.5.7. Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

Continuation

After students have become familiar, effective, and comfortable programming the Ozobot to use its sensors, there are a multitude of other options for students to continue their investigation of programming and sensors.

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