

Teacher Notes: Clap On, Clap Off

Introduction to Mobile Robotics > Clap On, Clap Off

Description of the Unit

In addition to motors, robots also have sensors that they can use to take in information about their environment. In this activity, students will be introduced to sensors and how to interpret the data they give back, specifically the Sound Sensor. They will calculate a threshold value, which will be an important skill.

Unit summary: students will...

- Calculate a threshold value for sound levels
- Use sensor thresholds to control the robot's behavior
- Write a program that makes the robot go and stop using sound
- Investigate the properties of sound waves and of the Sound Sensor

Prerequisites:

- Full Speed Ahead Activity (optional)
- Present to class the Clap On, Clap Off slideshow from Teacher's Curriculum CD and have class discussion (optional)

Approximate classroom time: 1-2 class periods (45-minute periods)

Note to the teacher

This Activity can be done with either the Taskbot model or the Robot Educator model (REM) robot. This Activity, "Clap On, Clap Off" is linked to the Exploration, "Frequency and Amplitude," in which lies the bulk of the experimentation, analysis and communication work. *It is highly recommended that both activities be used together*, as they both teach critical skills which students will need in future units.

- The Clap On, Clap Off Activity, which guides students step-by-step through the process of finding a threshold, programming the robot, and running through several programs that rely on the Sound Sensor to control the robot's actions.
- The Exploration, Frequency and Amplitude, which involves students in an investigation of the properties of a sound wave and which properties the Sound Sensor is able to distinguish.

Any activity or program using the Sound Sensor may be difficult to accomplish in a noisy classroom. The LEGO Sound Sensor is so sensitive that the robot is actually able to "hear" its own motors running if the Sound Sensor is mounted directly forward. It is recommended that the Sound Sensor be mounted in the position shown, so that it points upward. It is also recommended that classes be kept as quiet as possible. Encourage students to whisper, or have all the groups try their robots at the same time, so everyone claps in unison.

Students will be able to:

1. Program a robot using the LEGO MINDSTORMS programming environment to respond to environmental stimuli
2. Collect and apply data from the Sound Sensor
3. Calculate a threshold value