

REC Unit 4: Sensors

Catalog No.	77-8115-0040
Category	Mobile Robotics
Duration	15 Hours
Software	Coding platform of your choice that can be downloaded to the V5 controller

4.1 (Core): Introduction to Sensors

What Makes a Machine a Robot?

Why do Robots Need Sensors?

Common Types of Sensors

Worksheet: Introduction to Sensors

4.2 (Activity): Open-Loop vs. Closed-Loop Navigation

Safety Review

Open-Loop Systems

Closed-Loop Systems

4.3 (Core): Open-Loop vs. Closed-Loop Systems

- Open-Loop vs. Closed Loop Systems Closed-Loop Systems Feedback Analog and Digital Sensors Vex Sensor Interface
- Sampling Rate

Sensor Thresholds

Worksheet: Open vs. Closed Loop Systems



4.4 (Core): Introduction to Vex Kit Sensors

- Vex Digital Sensors
- Digital Sensors in the Real World
- Connecting Sensors to the Vex Controller
- Programming with Digital Sensors
- Write Pseudo-code
- Translate Pseudo-code
- Worksheet: Introduction to Digital Sensors

4.5 (Activity): Bumper Car

Specifications Assembling the Bumper Car Questions

4.6 (Core): Ultrasonic Sensors

Measuring Distance
Range Finding in Automobiles
Bumper Switches
Echolocation
SONAR
The Vex Ultrasonic Sensor
Reading the Distance to Objects
Limitations of the Ultrasonic Sensor
Other Ways of Measuring Distance
Worksheet: Echolocation and the Speed of Sound

4.7 (Activity): Ultrasonic Rangefinder

Using the Ultrasonic Sensor Install the Ultrasonic Rangefinder Test the Rangefinder Program Robot to Stop at a Specified Distance Challenge Project: Modify the Bumper Switch Program



4.8 (Core): Following Lines

Why Follow Lines?

What Line-Followers Do

How Optical Line Followers Work

How Height and Color Affect Operations

Calibration

Worksheet: Line-Tracking Sensors

4.9 (Activity): The Line-Following Sensor

Install the Line-Follower Determine the Characteristics of the Line-Follower Test the Line-Following Sensor

4.10 (Activity): Line Following

Introduction

The Robot Algorithm

Programming the Robot

Observation and Optimization

Upgrading to Three Sensors

Questions

4.11 (Unit Project): Bumper books

Overview

BaseBot Modifications

Challenge Guidelines

BaseBot Modifications

Challenge Guidelines

Post-Test Unit 4