

**Pleasant Hills Middle School
Technology Education Curriculum**

8th Grade
Automation Technology

May 2004

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Overview

In 8th grade students will explore the growing field of computer-controlled devices. In the world of technology, the computer is far more than desktop applications. The computer is used with devices that can monitor, control, power, and compile data automatically. A simple example is the “Self-Checkout” stations at supermarkets. The computer is the heart of a functioning checkout center, but there are also motors, light sensors, displays, scanners, scales, and many other computer-controlled devices. Students will use Legos® to design, build, and test an automated device that is programmed on the computer, transferred to a remote controller, and carries out a series of tasks. To gain a deeper understanding of automation, students will explore the impacts and consequences that automation has had on our society and culture. Finally, students will use a word processing program to create a written summary, with photos and diagrams, of their automated device.

Standards:

- 3.1.7.A: Explain the parts of a simple system and their relationship to each other.
- 3.1.7.B: Describe the use of models as an application of scientific or technological concepts.
- 3.2.7.D: Know and use the technological design process to solve problems.
- 3.7.7.B: Apply computer software to solve specific problems.
- 3.8.7.B: Explain how human ingenuity and technological resources satisfy specific human needs and improve the quality of life.

Course Outline

Day 1: What is a Robot?

- ✓ Body
- ✓ Control
- ✓ Behavior

Days 2 & 3: Robotic Control & Command

- ✓ Universal Systems Model and Robotics
- ✓ Systems
- ✓ Programming

Day 4: Sensors as Inputs

Day 5: Lego Sensors

- ✓ Touch
- ✓ Light
- ✓ Angle (Rotation)
- ✓ Temperature

Days 6 & 7: The RCX Brick

- ✓ Inputs
- ✓ Control
- ✓ Outputs

Day 8: Tankbot

Days 9 to 12: Programming RCX

- ✓ Programmer and Inventor Modes
- ✓ Functions pallet
- ✓ Tools pallet

- ✓ Applied Problem Solving

Day 13: Modifiers and Loops

Days 14 & 15: The Musical Challenge

Day 16: Conditional Statements

Days 17 & 18: Down the Track

- ✓ Automated Guided Vehicles
- ✓ Documentation

Days 19 & 20: Gear Ratios

- ✓ Speed
- ✓ Torque
- ✓ Ratio Calculations

Support Web Sites:

LEGO® MindStorms for Schools: Constructionism in Practice through Robotics

www.quasar.ualberta.ca/legorobots/index.htm

FIRST LEGO League Mentoring Handbook and Curriculum Reference

www.mitnycschools.com/intro_to_programming.pdf

National Robotics Engineering Consortium (NREC)

www.rec.ri.cmu.edu/

Resources:**Pitsco, Inc.**

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