LEGO® MINDSTORMS® Education helps to reinforce students’ understanding of science, math, technology and engineering. This program not only strengthens their ability to learn, students also become better at cooperating, communicating, and thinking independently. LEGO® MINDSTORMS® fits all ages and learning styles.

1. Robot Discovery Webquest
   By completing this webquest you will have learned ...
   How robots are being used now
   How robots may be used in the future and
   How will robots change your life as you know it today

2. Robots Video
   http://school.discovery.com/lessonplans/programs/robbie/ (video on right)

3. Integrating Robotics with Math, Science, Language & Media Arts, and Social Studies
   http://www.ceap.wcu.edu/houghton/EDELCompEduc/Ch8/robotics.html

4. An Introduction to Robotics – Curriculum Ideas
   http://schoolscience.rice.edu/duker/robots/whatiscurrrobot.html

5. Robotics Competitions in the U.S. - K12 Academics
   http://www.k12academics.com/robotics_comp.htm

6. Botball Educational Robotics Program – Integrates science, technology, engineering, and math with robotics
   http://www.botball.org/about-botball/overview.php

7. TheTech Robotics Classroom Activities

8. BEST Robotics – Coach Survival Guide

The word LEGO is derived from the Danish words “leg godt” which have a rough English translation of “play well”.

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CB motors found in the move block will move straight forward 180 degrees.

The robot will pause for 5 seconds.

The robot will show a display.

* Need to put time of display for a sec.

The robot will play the three timed notes.

CB motors found in the move block will move straight back for 360 degrees.

The robot will say a beeping noise.

The loop is controlled by the ultrasonic sensor.

The program ends.

The touch sensor starts the program.

CB motors found in the move block will move in a curve 2 rotations forward.

Robot will pause for 1 second.

Robot will display go sign.

The robot will display for 2 seconds.

CB motors found in the move block will move 180 degrees in a backward curve.

The robot will display for 2 seconds.

The program ends.
Language Arts

Reading, Writing, and Robotics Activities: (Ideas on the Fly)

- Choose an article on “service-oriented robots” such as “Today’s Robots Are Designed To Serve” by Jeanie Croasmun, http://www.ergoweb.com/news/detail.cfm?id=888 and ask students to read it.
- Lead a discussion with students regarding what they have observed about how robots are helping people with disabilities.
- Instruct the students to design a robot that will solve a problem for people with disabilities.
- Afterward, have students write a persuasive paragraph on how the invention affects the quality of life in a positive way for those who have disabilities. Source: http://school.discovery.com/lessonplans/programs/robbie/ (Robots video)
- Design a robot with an idea of how it could be used in a movie.

Social Studies

How to bring Robotics into Geography and Social Studies:

- Community/Environment Activity
  - Discuss with students what they have observed in their community that could be perceived as an environmental problem.
  - Direct students to construct a robot that will address and resolve something they perceive as problematic (waste recycling, transportation, crime, etc.) or provide a service not previously conceived (interactive public entertainment and art spaces for community, etc.)
  - Ask students to write an explanation of what the community problem is and how their robot could help to resolve the problem.
- Give students Longitude and Latitude coordinates and find locations with a Robot. (make a large map on the floor)
The program will loop until you turn off the robot.

2 second delay before the program starts.

Motors CB found in the Move Block will reverse straight forward.

The robot will pause for 1 second.

Motors CB found in the Move Block will reverse straight back.

Robot will show a Display for 1 second.

The robot will say good job.

The ultrasonic sensor is set to trigger the move block if an object gets closer than 50 inches to the robot.

The data subtraction block controls the speed of the robot.

Motors CB found in the Move Block will reverse straight back.

The robot will make a warning sound.

The program will loop until you turn off the robot.

The program ends.
Science

How to bring Robotics into scientific studies: 1. Displacement, Density, and Buoyancy
   a. Gather the following materials: ping pong ball, golf ball, rubber ball (same size), ruler, and a tub half-filled with water.
   b. Build robots that will pick up and drop each of the balls listed above.
   c. Have students measure the starting water line in the tub.
   d. Instruct the students to program the robot to complete the following tasks with each of the balls:
      e. Pick up ball
      f. Transport ball to the tub
      g. Drop ball into tub
      h. Measure the new water line created by displacement
      i. Discuss the displacement, density, and buoyancy that occurred.
      j. Optional: Graph and document results.
   2. Build a robot that uses speed and torque. Discuss the differences.

Math

How to bring Robotics into Math classes:

1. Mean, Median, and Mode
   a. Have students design a robot using a light, sound, or ultrasonic sensor.
   b. Get the threshold value by calculating the average (or mean) of the two values obtained by the sensor.
   c. Record the threshold values for all students’ sensor in list format.
   d. Instruct students to calculate the median and mode using this set of numbers.

2. Finding Distance using the Circumference of a Circle
   a. Mark the start and end marks of a designated distance for the robots to travel. Measure this distance using the metric system.
   b. Measure the radius of the wheel.
   c. Use the radius to calculate the circumference of the wheel.
   d. Multiply the number of programmed rotations by the circumference to determine the distance traveled.
   e. Extension: Convert metric to inches and/or feet.
   f. Extension: Invert the question to find the diameter of the wheel by using the distance value and number of rotations.