Lesson Title	Robot Labyrinth
Length of Lesson	2 Days
Created By	Dustin Spayde
Subject	Robotics
Grade Level	11-12
State Standards	
DOK Level	DOK 4
DOK Application	Design, Create, Apply Concepts, Analyze, Critique, Connect
National Standards	9-12: A(Inquiry), E (technology)
Graduate Research Element	Developing Automated Systems, Programming

Student Learning Goal:

National Science Education Standards of Content 9-12
A (Inquiry): Identify questions and concepts that guide scientific investigations.
E (Science and Technology): Abilities of technological design: propose designs and choose between possible solutions, implement a proposed solution, evaluate the solution and its consequences, communicate the problem, process, and solution; Understanding about science and technology

Materials Needed (supplies, hand-outs, resources): A Lego Mindstoms NXT kit per 2-3 students, Access to computers (one for each group) with USB ports and the RobotC software (or other compatible language) installed on each, black tape, some disposable cups (or soda cans, etc…)

Lesson Performance Task/Assessment:
Each team will demonstrate their final programs, which should enable their robot to navigate the labyrinth using only the motors and motor encoders. Also they will be required to turn in their programs with a pseudo code flowchart explaining their program.

Lesson Relevance to Performance Task and Students:
An automated vehicle such as this could easy be found in many factories and ports around the world. Developing its navigation system is an applicable task for a many engineering fields.

Anticipatory Set/Capture Interest:
Present the course to the students and explain that they are engineers tasked with developing a program that will allow the robot to safely complete the course. You can suggest that the course is the floor plan of a factory, and also have the students compete for the fastest time to complete the course accurately.

Guided Practice:
Day One: Students will be tasked developing a flowchart design for their programs before being allowed to use a computer. This forces students to plan and design before implementing and testing their programs. The instructor is to verify that a group has a preliminary design for their program and also observe a successful run through the course for credit.

Independent Practice:
Students design their programs on paper first, and then they will translate their designs into code with the computer. They are allowed and encouraged to test their programs on the course. After they have completed the course, the students will be tasked to explain their program by using a flowchart.

Remediation and/or Enrichment:
Remediation: individual IEP; partner help throughout lesson; shorten parts of assignment; focus upon smaller elements of the process

Enrichment/Extension:
Set up a seminar in which students explain the design of their programs to the rest of the class.

Check(s) for Understanding:

Day One: Does every group have a preliminary flow chart? , Why did you choose this design?
Day Two: Have all students begun tested their programs? How can you improve your robot's performance?
Day Three: All groups should have the course completed and have a completion time.

Closure:

Ask which method is the best and why?

Possible Alternate Subject Integrations:

*Math – can manipulate mathematical expressions to isolate needed variables

*Programming – Basic logic and algorithm models

Teacher Notes: