Lesson Title	Robot Olympics
Length of Lesson	6 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 5 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 in order to qualify for each event, which should enable their robot to complete the challenge within the given requirements. Groups will also give a presentation to the class about their designs, discussing robot design and program design for each event. This presentation should focus on why their design will work well for each event. Groups will compete in all five events and medals (worth points) will be awarded for each event.

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. Good experience for competing with another engineering firm for a contract.

Anticipatory Set/Capture Interest:
Robot Olympics opening ceremony

Guided Practice:
Day One: Divide students into groups, explain the grading setup for this lesson, and explain the events and rules.

Grading

Individual	
Event Qualification	49 points
Group	
Design Presentation	30 points
Gold Medal	10 points
Silver Medal	7 points
Bronze Medal	5 points

Independent Practice:
Days 1-4: As a group the students must design a robot that can compete in all 5 events without modifying the robot on competition day. Each student will be responsible for programming their team's robot for one event, and qualifying for that event. Also each group will need to create a power point slide showing their robot's features and discussing their programs designs.

Day 5: Present

Day 6: Competition

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 faculty or others from outside the class.

Check(s) for Understanding:

Day One: Do all groups have the basics of their robot design worked out?
Day Two: Have all students begun tested their programs? How can you improve your robot's performance?
Day Four: All groups should have the completed qualification and have a completion time.

Closure:

Ask which design 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:

Make sure to choose 5 events that can be completed with one robot design.