3. Design Challenge

Content Area: **Technology**
Course(s):
Time Period: **Cycle**
Length: **6 days**
Status: **Published**

General Overview, Course Description or Course Philosophy

This 22-day cycle course for 8th grade students serves as a continuation of the robotics curriculum started in 7th grade. Through problem solving activities and project based collaboration, students will use experimentation, testing, and analysis to develop foundational skills in the areas of algorithm construction, scripting, engineering design, and prototype testing. The course culminates in students designing and completing their own robot using knowledge that they've acquired over the marking period, with the goal of solving a given challenge.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Students will be able to design vehicles using sensors to navigate and complete Lego League challenges and student generated challenges.

CONTENT AREA STANDARDS

CS.6-8.8.1.8.CS.1	Recommend improvements to computing devices in order to improve the ways users interact with the devices.
CS.6-8.8.1.8.CS.2	Design a system that combines hardware and software components to process data.
CS.6-8.8.1.8.CS.3	Justify design decisions and explain potential system trade-offs.
CS.6-8.8.1.8.CS.4	Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.
SCI.MS-ETS1-2	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
SCI.MS-ETS1-1	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
SCI.MS-ETS1-3	Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
SCI.MS-ETS1-4	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

LA.RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LA.RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
LA.RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LA.WHST.6-8.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

STUDENT LEARNING TARGETS

Refer to the 'Declarative Knowledge' and 'Procedural Knowledge sections.

Declarative Knowledge

Students will understand that:

- Algorithmic Thinking is the ability to create an ordered series of steps with the purpose of solving a problem.

Procedural Knowledge

Students will be able to:

- Design an autonomous car that can safely cross an intersection.
- Navigate challenges using various sensors and blocks.

EVIDENCE OF LEARNING

Refer to the 'Formative Assessments' and 'Summative Assessments' sections.

Formative Assessments

Daily checklist

Project checklist

Informal Observations

Pseudocode

Exit Ticket

Summative Assessments

Successful completion of task

Teacher generated post-task worksheet

RESOURCES (Instructional, Supplemental, Intervention Materials)

Mindstorm EV3 Programming app.

 - Brick buttons

 - Loops

 - Variables

-sensors

INTERDISCIPLINARY CONNECTIONS

Science, Technology, Engineering and Mathematics

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.