2. Variable Block and Array Operations (Roaming Vehicles)

Content Area: **Technology**
Course(s):
Time Period: **Cycle**
Length: **8 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.

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-ETS1-1	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-ETS1-2	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
SCI.MS-ETS1-3	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:

- The use of data structures such as lists, tables, and arrays play an important role in the field of science and computer programming as well as society.
- Boolean logic will be used to strengthen their understanding of it as well as how it is used within programming and circuits.
- Evaluating and debugging the ability to verify whether or not a prototype works as intended, and if not, the ability to identify
  what needs to be improved. It is also the process a computer programmer goes through in order to find and correct mistakes within a program.

Procedural Knowledge

Students will be able to:

- Students will be able to design vehicles using sensors to navigate and complete Lego League challenges. This will let the studentshave time to work on the current Lego League challenges or past challenges
- Make appropriate use of data structures such as lists, tables, and arrays
- Extend and strengthen their knowledge of Boolean logic and some of its uses in circuits and programming
- Use the Variable Block to store information
- Use the Array Operations Block

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)

Mindstorms EV3 Programming app (on computer)

- Variable

- Brick buttons

- Loop

- Array Operations

- My blocks

INTERDISCIPLINARY CONNECTIONS

Mathematics

Communication

Science, technology, Engineering, and Math

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.