Unit 1: Robotics

Content Area: **Technology**
Course(s): **Technology**
Time Period: **Marking Period 1**
Length: **Weeks**
Status: **Published**

Unit Overview

This unit will also provide an introduction to the Lego WeDO Robotics Design System, students will get an overview of the different subsystems within the WeDo system and how they interact together. Students will then put this knowledge into practice as they follow step-by-step directions to build a motion sensor alligator.

Standards

TECH.8.2.5.C	Design: The design process is a systematic approach to solving problems.
TECH.8.2.5.C.5	Explain the functions of a system and subsystems.
TECH.8.2.5.C.6	Examine a malfunctioning tool and identify the process to troubleshoot and present options to repair the tool.
TECH.8.2.5.C.7	Work with peers to redesign an existing product for a different purpose.
TECH.8.2.5.C.CS1	The attributes of design.
TECH.8.2.5.C.CS3	The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.
TECH.8.2.5.D.CS1	Apply the design process.
TECH.8.2.5.E	Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.
TECH.8.2.5.E.1	Identify how computer programming impacts our everyday lives.
TECH.8.2.5.E.2	Demonstrate an understanding of how a computer takes input of data, processes and stores the data through a series of commands, and outputs information.
TECH.8.2.5.E.3	Using a simple, visual programming language, create a program using loops, events and procedures to generate specific output.
TECH.8.2.5.E.4	Use appropriate terms in conversation (e.g., algorithm, program, debug, loop, events, procedures, memory, storage, processing, software, coding, procedure, and data).
TECH.8.2.5.E.CS1	Computational thinking and computer programming as tools used in design and engineering.

Essential Questions

- How can the engineering process help solve practical problems?
- How is the engineering design process useful for planning?

Application of Knowledge: Students will know that…

- Different materials are used in making things.
- Engineering design requires creative thinking and consideration of a variety of ideas (and strategies) to solve practical problems
- Engineers have an impact on the world they live in and their daily lives.
- Systems have parts that work together to accomplish a goal
- The engineering design process is useful for planning and guiding the creation of artifacts.

Application of Skills: Students will be able to…

- Build a sturdy, robotic vehicle using LEGO® bricks and other materials.
- Communicate using digital media
- Create a control system that uses switches to control motors direction and speed.
- Create a programmable model to demonstrate the knowledge and operation of digital tools and technological systems.
- Improve the alligator's behavior by adding the motion sensor and programming sounds to coordinate with the movement.

Assessments

The teacher will formally assess students throughout the unit by using rubrics for the following project or other projects determined by the teacher:

- Motion controlled alligator
- Build a roaring lion

Suggested Activities

- Students will start each class by navigating to Google Classroom and responding to a writing prompt. In responding to the writing prompt, students will be collaboratively conversing with each other and their teacher digitally, using their schema of keyboarding and mouse skills.
- Engineer of the Week: Each week, a new engineer will be briefly introduced to the class, highlighting their impact on their current world.
- Build a motion sensor alligator: Students will build and program a mechanical alligator that makes sounds and is motorized to open and close its jaw
- Lion: Students will build and program a mechanical lion that makes sounds and is motorized to lift and lower its front legs as if it is sitting up and lying down.

Activities to Differentiate Instruction

Enrichment Opportunity:

- Students can use NAO robot to learn Python and program a humanoid robot
- Studens can use advanced robotics kits to build alternate robot
- Mindstorms to build Alpha Rex

Integrated/Cross-Disciplinary Instruction

- Science- Students will learn about alligators and lions and their habitats.
- Math- Building the robot will need specific amounts materials. Together we will be counting the parts of the robot
- Language Arts- Students will have the opportunity using the WeDo software to create a story about their animal. They will also have the opportunity to place their animal in different scence and be able to tell different parts of a story.

Resources

- Lego WeDO Robotics
- Mindstorms- If needed
- NAO Robot-if needed