Unit 2 - Engineering and Design - Robot Arm

Content Area: **Technology**
Course(s): **Technology 4**
Time Period: **December**
Length: **8 Classes**
Status: **Published**

Unit Overview

This unit will take approximately 8 classes.

Vocabulary for this unit includes: Design Process, Prototype, Troubleshooting, Innovate

Priority Standards

CS.3-5.8.2.5.ED.2	Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
CS.3-5.8.2.5.ED.3	Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.

Essential Questions

- How can the design process assist me in creating something?
- How can the design process help me to innovate?

Unit Learning Goals

- SWBAT create a basic robot arm by utilizing the design process
- SWBAT create a prototype sketch of a robot arm in cooperation with a peer.
- SWBAT differentiate the order of the design process.
- SWBAT expresss in writing how each step of the design process was utilized in the creation of their arm.

Unit Learning Targets

- I can design a working product by creating an illustration with my peer.
- I can explain how I utilized each step of the design process when creating my arm.
- I can order and describe the steps of the design process.
- I can utilize the design process to assemble assemble an arm that can pick up a cup.

Marzano Elements

- Helping Students Engage in Cognitively Complex Tasks
- Helping Students Examine Similarities & Differences
- Helping Students Examine their Reasoning
- Helping Students Practice Strategies, Skills, & Processes
- Helping Students Process New Content
- Helping Students Revise Knowledge
- Identifying Critical Content from the Standards
- Previewing New Content
- Providing Feedback & Celebrating Success
- Using Formative Assessment to Track Progress

Strategies for Differentiating Instruction

- Meet with students individually and as a group to provvide specific advice and guidance according to progress indicated on robot arm/illustration
- Provide written instructions as needed in addition to the electronic ones provided
- Read directions individually to the student and have them clarify back what the expectation is.
- Provide feedback to students indiviadually and by group by peridocally meeting about the progress of their robot arm
- Have student state what guidance they have provided to their partner. (Also fill in for missing partners)
- Model how to interact with a peer in a constructive way.
- Allow and encourage more or less complex arm designs according to ability

Unit Assessments (Required)

- Robot arm design assessment
- Project reflection assessment

Unit Assessments (Optional)

- Design process assessment

Unit Learning Goals / Targets / Plans

Class	Topic	Lesson / Activity	Standard / Learning Goal / Target
1	The Design Process	Introduction to the design process	**Standard**: **CS.3-5.8.2.5.ED.3 -** Identify pot problems using common troubleshooting stra **Learning Goal**: SWBAT differentiate the or **Learning Target**: I can order and describe tl
2	Introduction to Robot Arms	Introduction of Robot Arm project, and creation of a prototype	**Standard**: **CS.3-5.8.2.5.ED.2 -** Collaborate a problem, and evaluate all possible solution or models. **Learning Goal**: SWBAT create a prototype **Learning Target**: I can design a working pr
3-7	Robot Arm Design and Construction	Construction and troubleshooting of robot arms	**Standard: CS.3-5.8.2.5.ED.3 -** Identify pote problems using common troubleshooting stra **Learning Goal**: SWBAT create a basic robo **Learning Target**: I can utilize the design pr
8	Robot Arm Testing / Conclusion	Design Process Explanation of Use and Testing of Arm	**Standard: CS.3-5.8.2.5.ED.3 -** Identify pote problems using common troubleshooting stra **Learning Goal**: SWBAT express in writing the creation of their arm. **Learning Target**: I can explain how I utilize arm.

Cross Curricular Connections

- 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
- 4.G.A Graph points on the coordinate plane to solve real-world and mathematical problems.
- 4.MD.B Represent and interpret data.

21st Century Themes

For this unit, students will work on the following 21st century themes:

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP4. Communicate clearly and effectively and with reason.
- CRP6. Demonstrate creativity and innovation.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP9. Model integrity, ethical leadership and effective management.
- CRP11. Use technology to enhance productivity
- CRP12. Work productively in teams while using cultural global competence.

Materials and Resources

Google Classroom

PBS Kids Design Squad

Engineering for Kids