

Unit 3: Engineering - Robotics

Unit #: APSDO-00103974
Team: Eric Lord (Author)

Grade(s): 8
Subject(s): Technology
Course(s): GR. 8 - TECHNOLOGY EDUCATION

Unit Focus

In this unit, students will explore and apply a variety of engineering principles in an iterative design/build process through robotics. Using VEX IQ bots and software, students will work in small groups to complete specific challenges culminating with a unit-end classwide competition. Emphasis is placed on collaboration, and the experimentation and testing integral to iterative designing. Primary instructional materials include, but are not limited to, VEX IQ robotics kits, challenge field, and other accessories as well as various software (e.g., VEXcode VR, VEXcode IQ, VEXos).

Stage 1: Desired Results

Established Goals	Transfer	
<p>Standards</p> <ul style="list-style-type: none"> • ISTE Standards (2016) <ul style="list-style-type: none"> ◦ <i>ISTE Standards for Students</i> <ul style="list-style-type: none"> ▪ Empowered Learner - Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences. (1) ▪ Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies. (1.d) • Connecticut Goals and Standards <ul style="list-style-type: none"> ◦ <i>Technology Education: 7-12</i> <ul style="list-style-type: none"> ▪ ENGINEERING TECHNOLOGY <ul style="list-style-type: none"> ▪ ENG101 Use the design process to solve problems by creating and refining prototypes. ▪ ENG104 Works collaboratively in engineering teams throughout the design process. 	<p><i>What kinds of long-term, independent accomplishments are desired? Students will be able to independently use their learning to...</i></p> <p>T1 (T1) Explore and evaluate the use of technology in personal interests, aspirations, and/or employment opportunities.</p> <p>T2 (T3) Identify a problem or need and use technology to develop a solution.</p> <p>T3 (T5) Effectively collaborate with others toward(s) a common goal in the development of design and implementation.</p>	
	Meaning	
	Understanding(s)	Essential Question(s)
	<p><i>What specifically do you want students to understand? What inferences should they make? Students will understand that...</i></p> <p>U1 (U300) When presented with a challenge, the Design Process is an effective, iterative sequence that values information gained from both successes and failures to develop an innovative solution.</p> <p>U2 (U500) Effective collaborators work to achieve the best possible outcome through constructive and interdependent conversations and actions.</p>	<p><i>What thought-provoking questions will foster inquiry, meaning making, and transfer? Students will keep considering...</i></p> <p>Q1 (Q301) Input: What are the constraints and available resources?</p> <p>Q2 (Q305) Process: What real-time adjustments might I need to make?</p> <p>Q3 (Q306) Output: To what extent did the solution address the identified problem/need?</p> <p>Q4 (Q500) How are we working together to get the job done? To what extent is it effective? What might need to be changed going forward?</p>
	Acquisition	
Knowledge	Skill(s)	

	<p><i>What facts and basic concepts should students know and be able to recall? Students will know...</i></p>	<p><i>What discrete skills and processes should students be able to use? Students will be skilled at...</i></p>
	<p>K1 What exactly a robot is and the ever-expanding impact that the design, development, and implementation of robots have on many, if not most, aspects of our modern lives</p> <p>K2 That an iterative approach is essential for success in most, if not all, design processes</p> <p>K3 That selecting and applying the appropriate engineering concepts has a direct correlation with successful challenge solving</p>	<p>S1 Applying a systematic problem-solving method to assist in troubleshooting and achieving successful outcomes</p> <p>S2 Working collaboratively in a team-based environment to leverage the strengths of the group</p> <p>S3 Selecting and applying the appropriate engineering principles to ensure the robots achieve specific goals</p>