

Units	Projects	Focus KSA (SWBAT...)	Continuing KSA
1 & 2. Build your own GoPiGo3	Assemble the GoPiGo robot	No KSA pertaining to Software, however, it is critical that the robot is assembled in order to learn programming or use the software.	
3. Project 1: Connecting to the GoPiGo3	Connecting a computer to your GoPiGo	Connecting to the GoPiGo over Wifi <ul style="list-style-type: none"> <li>● <b>What is Software [in a Robotics Context]</b> <ul style="list-style-type: none"> <li>○ Identify software vs. hardware vs. firmware (K)</li> <li>○ Understanding the role of programmer in the design of a robotic system (KA)</li> </ul> </li> </ul>	

<p>4. Project 2: Obstacle Course</p>	<p>Navigate through an obstacle course</p>	<p>Planning the maneuvers and designing the obstacle course</p> <ul style="list-style-type: none"> <li>● <b>How software is used on a robot</b> <ul style="list-style-type: none"> <li>○ Understand that logic is separable from any particular software (K)</li> <li>○ Know that logic can be expressed in words (pseudocode), diagrams (flow charts), and other forms (K)</li> <li>○ Read and reason about algorithms using pseudocode (S)</li> <li>○ Read and reason about algorithms using flowcharts (S)</li> </ul> </li> </ul> <p>Coding the robot</p> <ul style="list-style-type: none"> <li>● <b>How software is used on a robot</b> <ul style="list-style-type: none"> <li>○ Software programs implement control logic for robots (KS)</li> </ul> </li> <li>● <b>Understand and write programs to implement simple control logics (KS)</b> <ul style="list-style-type: none"> <li>○ Understanding commands and parameters as parts of a line of code (KS)</li> <li>○ Understanding the meaning of the commands and parameters (KS)</li> <li>○ Read and program simple behaviors using (KS): <ul style="list-style-type: none"> <li>i. Conditional Execution (sensor-contingent)</li> </ul> </li> </ul> </li> <li>● <b>What input and output devices do robot programs typically interface with? (KS)</b> <ul style="list-style-type: none"> <li>○ <b>(Actuators)</b> Identify common output devices used by robots <ul style="list-style-type: none"> <li>i. Motors</li> </ul> </li> </ul> </li> </ul>	
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<p>5. Project 3: Biomimicry</p>	<p>Construct a robotic animal to mimic their behavior</p>	<p>Construct and program a robot to act as an animal that uses a color/light sensor</p> <ul style="list-style-type: none"> <li>● <b>What is Software [in a Robotics Context]</b> <ul style="list-style-type: none"> <li>○ Software can be changed quickly and easily compared to hardware (KA)</li> </ul> </li> <li>● <b>How software is used on a robot</b> <ul style="list-style-type: none"> <li>○ Understand that typical control logic for robots includes sensing environments, planning a response, and executing that plan [SPA] (K)</li> </ul> </li> <li>● <b>What input and output devices do robot programs typically interface with? (KS)</b> <ul style="list-style-type: none"> <li>○ <b>Sensors</b> - Understand the physical principles behind common sensors, the kinds of input they would be expected to generate, their typical uses, and their typical failure modes [KS] <ul style="list-style-type: none"> <li>i. Passive optical sensors</li> <li>ii. Reflective range finding sensors: <ul style="list-style-type: none"> <li>1. Optical (laser)</li> </ul> </li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● <b>How software is used on a robot</b></li> <li>● <b>Understand and write programs to implement simple control logics (KS)</b></li> </ul>
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<p>6. Project 4: Noise Patrol</p>	<p>Construct a robot to detect loud noise</p>	<p>Construct and program a robot to detect loud noises</p> <ul style="list-style-type: none"><li>● <b>Understand and write programs to implement simple control logics (KS)</b><ul style="list-style-type: none"><li>○ Read and program simple behaviors using (KS):<ul style="list-style-type: none"><li>■ Open-loop command sequences (discrete or timing-terminated)</li><li>■ Closed-loop command sequences (sensor-terminated)</li><li>■ Conditional Execution (sensor-contingent)</li></ul></li><li>○ Loops and iteration<ul style="list-style-type: none"><li>■ Pure repetition (same commands n times)</li><li>■ Conditional repetition (while sensor &lt; 200)</li></ul></li></ul></li></ul>	<ul style="list-style-type: none"><li>● <b>How software is used on a robot</b></li><li>● <b>Understand and write programs to implement simple control logics (KS)</b></li><li>● <b>What input and output devices do robot programs typically interface with? (KS)</b></li></ul>
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7. Project 5: Service Animals	Construct a robot to use a Distance sensor to detect objects	<ul style="list-style-type: none"><li>● <b>What input and output devices do robot programs typically interface with? (KS)</b><ul style="list-style-type: none"><li>○ <b>Sensors</b> - Understand the physical principles behind common sensors, the kinds of input they would be expected to generate, their typical uses, and their typical failure modes [KS]<ul style="list-style-type: none"><li>i. Reflective range finding sensors:<ul style="list-style-type: none"><li>1. Acoustic (sonar)</li></ul></li></ul></li></ul></li><li>● <b>Understand and write programs to implement simple control logics (KS)</b><ul style="list-style-type: none"><li>○ Read and program simple behaviors using (KS):<ul style="list-style-type: none"><li>i. Loops and iteration<ul style="list-style-type: none"><li>1. Conditional repetition (while sensor &lt; 200)</li></ul></li></ul></li></ul></li></ul>	<ul style="list-style-type: none"><li>● <b>What input and output devices do robot programs typically interface with? (KS)</b></li></ul>
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<p>8. Project 6: Timer</p>	<p>Construct a timer that creates a buzz when time is out</p>	<ul style="list-style-type: none"><li>● <b>What input and output devices do robot programs typically interface with? (KS)</b><ul style="list-style-type: none"><li>○ <b>(Actuators)</b> Identify common output devices used by robots<ul style="list-style-type: none"><li>i. Speakers</li></ul></li></ul></li></ul>	<ul style="list-style-type: none"><li>● <b>What input and output devices do robot programs typically interface with? (KS)</b></li></ul>
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