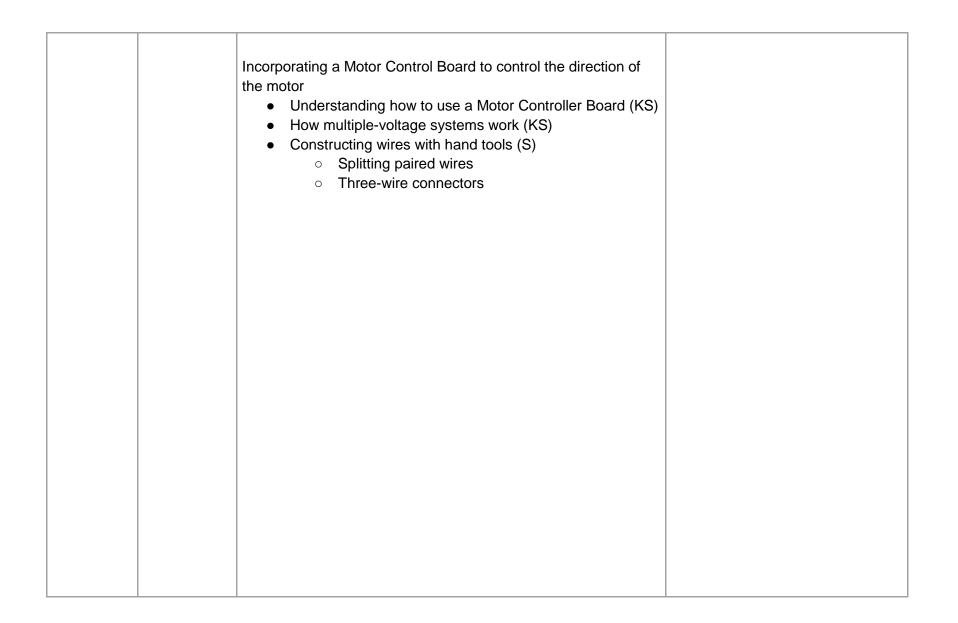
Units	Projects	Focus KSA (SWBAT)	Continuing KSA
1. Wiring & Circuits	Construct a Light box	Construct simple circuits Constructing wires with hand tools (S) Cutting and stripping wire (S) Crimping connectors onto wire (S) Identifying conductors & insulators (K) Selecting/attaching connectors (S) Attaching alligator clip onto wire (K) Using electrical tape to secure wires (K) Troubleshoot and test wires Using Multimeters to test for Conductivity/Continuity (S) Control flow of electricity in circuits (S) Switches (K) 	
2. Voltage: Parallel and Series Circuits	Construct an LED sign	Creating and understanding the differences between series and parallel circuits (KS) Construct a series circuits (K) Construct parallel circuits (K) Construct wiring panels using Terminal Blocks (K) Understanding how Voltage is distributed (K) Understanding Voltage nodes (K) Understanding and measuring Voltage drops (KS) Jumpers (KS) Understanding wire coloring conventions (K)	 Constructing wires with hand tools (S) Using Multimeters to test for Conductivity/Continuity (S)

 Using Multimeters to measure Voltage (S) Selecting/attaching connectors (S) Attaching spade connectors (S) Using screw terminals (S) 	

3. Voltage and Current: Motors	Construct a Personal fan	 Constructing a circuit to power a motor using a coin cell battery Understanding and using Moderate-voltage systems (KSA) Understanding Safety with circuits (K) Understanding how Motors are powered (K) How battery size affects and voltages (K) Understanding torque and stalling of motors (K) Taking a deeper look into why the single cell battery failed Measuring Current using a Multimeter (S) Understanding current/amperage (K) Creating a larger battery How a larger battery could affect voltage (K) Understanding larger batteries and charge capacity (K) Safety warnings regarding higher voltages and current (K) 	 Constructing wires with hand tools (S) Using Multimeters to test for Conductivity/Continuity (S)
		 Changing the circuit so that the motor's direction is changed Flow/direction of current in a motor and how it affects the motor (K) 	
		Adding a Fuse to your circuit • AC and DC (K) • Fuses and breakers • Purpose (K) • Identifying (KS) • Checking (S) • Installing/Changing (S)	

4. Controlling Signals	Construct a 2-wheel cart	Creating a circuit that is powered by a microcontroller (or "brain") • Programmable controllers (K) • Understanding how to set up a basic micro-	 Constructing wires with hand tools (S) Using Multimeters to test for Conductivity, Voltage, and
		 controller (Arduino Unos) (KS) Understanding and using General Purpose Input/Outputs (GPIO) pins (KS) Plugging into the system ground (KS) Using a programming software (KS) Selecting/attaching connectors (S) Header pins (KS) Male/Female connectors (KS) Basic Programming Uploading program to microcontroller (S) Reading comments in a program (S) 	 Amperage (S) Understanding and creating Moderate-voltage systems
		Making the LED blink faster	
		 Programming basic signals (KS) 	
		 Arduino IDE 	
		○ Blink	
		 Comments 	
		 Parts of program 	
		○ digitalWrite	
		∘ pinMode	
		 delay() + milliseconds 	
		 Uploading programs 	
		 Modifying programs 	
		Incorporating Relays into the circuit to control motors	
		 Understanding how Relays work (K) 	
		 Understanding how H-Bridges work (K) 	



5. Sensors	Constructing an Autonomous Kicker	 Detecting bumps using a limit switch Programming basic signals (KS) Input signals Output signals PULLUP Mode Understanding how sensors work (K) Limit Switches Detecting objects from a distance Understanding how sensors work (K) Distance/Ultrasonic Sensors 	 Selecting/attaching connectors (S) Constructing wires with hand tools (S) Moderate-voltage systems Programming basic signals (KS)
6. E-Panel	Constructing a Power Distribution Panel	 Planning and constructing the layout of a electronics board Electronics Organization/Planning (KS) Planning Layout (S) Labeling (S) Wiring Harnesses & Conduits (S) 	 Constructing wires with hand tools (S) Selecting/attaching connectors (S) Header pins (KS) Male/Female connectors (KS)

Broader KSA:

Multimeter troubleshooting (S) Opens/Shorts Voltage Current Valuing workmanship (A) Robustness/reliability Organization/neatness Safety (A)