

Course: Electricity

Grade Level: 9-12

Time:	Standards:	Topics:	Essential Questions:	Content and Skills (What the Students Will Know And Be Able To Do):	Specific Assessments:	Resources:
1 week	MST 3 MST 4	Electricity Terms and Formulas	What is Charge? What is Voltage? What is Current? What is Resistance? How are Voltage(V), Current(I), and Resistance(R) related to each other?	Describe what a Charge is. Explain what voltage, current and resistance are and how they are related to each other. Understand and Use Ohm's law to calculate V,I, & R given the other two.	Worksheets	
1 week	MST 5	Using a Multimeter	How do you measure Voltage, Current, and Resistance in a DC circuit?	Measure DC Voltage Measure DC Current Measure Resistance	Worksheets, Practicum	
1 week	MST 3 MST 4 MST 5	Evaluating Series Circuits	Why and How does Voltage Drop across a series circuit? What happens to the current across a series circuit? How do different resistances combine along a series circuit?	Calculate and measure voltage drops along a series circuit. Calculate and measure the current along a series circuit. Calculate and Measure the total resistance of a series circuit.	Worksheets, Practicum	
1 week	MST 3 MST 4 MST 5	Evaluating Parallel Circuits	Why and How does Voltage Drop across a parallel circuit? What happens to the current across a parallel circuit? How do different resistances combine along a parallel circuit?	Calculate and measure voltage drops along a parallel circuit. Calculate and measure the current along a parallel circuit. Calculate and Measure the total resistance of a parallel circuit.	Worksheets, Practicum	

2 weeks	MST 3 MST 5	Electrical Power, Electrical Components and Wiring Diagrams	<p>What is Watt's Law and how do you use it?</p> <p>What are the symbols for resistors, capacitors, inductors, lamps, power supplies, batteries, relays, switches, diodes, LEDs, and transistors?</p> <p>How do you read wiring diagrams?</p>	<p>Calculate wattages given 2 of the following (voltage, current, resistance).</p> <p>Identify the different electrical components and be able to explain the properties and possible functions of each.</p> <p>Read wiring diagrams and be able to tell what components are connected to what, the current flow in each section, and the voltage at each point along the circuit.</p>	Worksheets, Test	
3 weeks	MST 5 MST 7	Household Wiring (outlet, switch, lighting fixture, 3-way switch)	<p>Where are series and parallel circuits used in house wiring?</p> <p>How do you wire an outlet, switch, lighting fixture, and 3-way switches?</p> <p>What are the different kinds of wire and what are each used for?</p>	<p>Physically install and properly connect duplex outlets, switches, lighting fixtures and 3-way switches correctly, safely, and conforming to building codes.</p> <p>Identify the different types of wire used in homes and be able to use them properly.</p>	Worksheet, Hands-on Lab project	
4 weeks	MST 1 MST 3 MST 5	LED Sign	<p>How are electronic components connected to each other?</p> <p>How do you translate a physical electrical layout into a usable wiring diagram?</p>	<p>Use a soldering Iron safely and effectively to connect battery packs, switches, resistors, and LEDs together.</p> <p>Calculate the parallel resistance of the LEDs in each circuit and then to calculate the necessary resistor to add in series to achieve proper current through each LED.</p> <p>Draw a correct wiring diagram from their sign design in order to lay everything out correctly.</p>	Worksheet, Hands-on Individual Project	
2 weeks	MST 1 MST 5	Electric Motor	<p>How does electric current generate a magnetic field and vice-versa?</p> <p>How does the direction of current flow affect the polarity of the magnetic field?</p>	<p>Build a DC brush electric motor that consists of a battery pack, switch, 2 permanent magnets, and 2 electromagnets that are switched in polarity every half rotation of the motor</p>	Hands-on Individual Project	

2 weeks	MST 5	Transistors, LC circuits and RF signals	<p>How do transistors operate both as electronic switches and as an amplifier of a signal?</p> <p>How are transistors biased so as to minimize "clipping" of a signal while still maintaining adequate signal "gain"?</p> <p>How can a RLC (Resistor, Inductor, Capacitor) circuit output an alternating signal?</p> <p>How do you calculate the frequency of a RLC circuit signal and how can one use a variable capacitor to change the frequency?</p> <p>What frequencies do AM and FM radio operate and how does each achieve the transmission of their signal?</p>	<p>Understand the operations of transistors in both switching and amplifying applications. Setup a circuit so as to bias the transistors base so that the signal is always in the positive voltage area.</p> <p>Calculate signal gain from a transistor in the amount of current flowing from the base compared to that flowing from the collector. Setup a RLC circuit and size the components to be in the FM radio spectrum.</p> <p>Use variable capacitors to tune a circuit to a precise frequency.</p> <p>Understand the ranges and processes that AM and FM radio signals use</p>	Worksheets, Test	
3 weeks	MST 5	Radio signal blocker	How do you combine a RLC circuit and a transistor to achieve a RF signal transmitter?	Follow a wiring diagram and build a RF signal jammer using their knowledge of RLC circuits and transistor based amplifiers	Hands-on Individual Project	