



## Electric Experiments (9-12)

Hello! This document includes a brief outline of our Electric Experiments workshop, as well as relevant BC ADST curriculum connections. In this workshop, students will learn about the basics of circuit breadboarding, then will build their own electric machines & battle against each other!

<b>BC Curriculum Ties</b> (In addition to satisfying multiple core competencies)	<u><b>BC Applied Design, Skills, and Technologies Curriculum Links 9-12:</b></u>  <b>Electronics &amp; Robotics 9:</b> <ul style="list-style-type: none"><li>• <i>Uses of electronics and robotics</i></li><li>• <i>Components of an electric circuit ways in which various electrical components affect the path of electricity</i></li><li>• <i>Ohm's law</i></li><li>• <i>Basic robot behaviours using input/output devices, movement- and sensor-based responses, and microcontrollers</i></li><li>• <i>Mechanical devices for the transfer of mechanical energy</i></li><li>• <i>Various platforms for robotics programming</i></li></ul> <b>Electronics 10-12:</b> <ul style="list-style-type: none"><li>• <b>Content:</b><ul style="list-style-type: none"><li>◦ <i>Ohm's Law, breadboard circuitry, function &amp; application of components, construction sequences involved in making a working circuit, electrical theory using series circuits, standard layout and symbols for wiring and schematic diagrams.</i></li></ul></li><li>• <b>Applied Design:</b><ul style="list-style-type: none"><li>◦ <i>Prototyping - Making changes to tools, materials, and procedures as needed.</i></li><li>◦ <i>Making - Identify and use appropriate tools, technologies, materials, and processes.</i></li></ul></li><li>• <b>Applied Skills:</b><ul style="list-style-type: none"><li>◦ <i>Develop competency and proficiency in skills at various levels involving manual dexterity and circuitry.</i></li></ul></li></ul> <b>BC ADST: Engineering 10-12:</b> <ul style="list-style-type: none"><li>• <b>Content:</b></li></ul>
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	<ul style="list-style-type: none"> <li>○ <i>Fundamentals of robotics and robotic manufacturing, simple robotics design and production, future career options and opportunities in engineering, including design, production, and emerging applications.</i></li> </ul>
<b>Grade Levels</b>	9-12
<b>Time</b>	1~1.5 Hours
<b>Goals of the Workshop</b>	<ol style="list-style-type: none"> <li>1. Understand the basics of electrical breadboarding &amp; circuits, including Ohm's Law, connected series circuits, &amp; how DC Motors work.</li> <li>2. Understand how to refine and implement new mechanical systems by themselves to improve their Artbots.</li> </ol>

## Activity Descriptions

### Circuits 101 Demo

Objective: To teach students about the basics of circuits, and how breadboards are used by electrical engineers.

Participants will:

- Learn from a breadboard how electricity flows within a circuit, and discuss the importance and application of circuits & electricity

## ArtBot Battle Royale

Objective: To use the previously learned concepts to create simple electrical machines that will compete against each other!

Participants will:

- Construct a simple machine using a DC motor & a battery pack that will rotate, move, & draw along a piece of paper due to the motor's rotations.
- Implement mechanical features & systems on their Artbots to further improve & refine their machines.
- Compete against their classmates to push each other's machines off the game board, where the last machine standing wins!

**We can't wait to connect with your school & expose your students to the STEM field with our exciting, hands-on STEM activities!**

