

## Electric Experiments (10-12)

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!

If you'd like to register for our workshops, please fill out our registration survey linked here: [https://ubc.ca1.qualtrics.com/jfe/form/SV\\_eQbTY2Kj1ByZM8K](https://ubc.ca1.qualtrics.com/jfe/form/SV_eQbTY2Kj1ByZM8K)

<p><b>BC Curriculum Ties</b> (In addition to satisfying multiple core competencies)</p>	<p><u>BC Applied Design, Skills, and Technologies Curriculum Links 10-12:</u></p> <p>Electronics 10-12:</p> <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> <p>BC ADST: Engineering 10-12:</p> <ul style="list-style-type: none"> <li>• <b>Content:</b> <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> </li> </ul>
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<b>Grade Levels</b>	10-12
<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

### TinkerCAD Intro to Breadboarding

Objective: To learn about the basics of electrical breadboarding by creating circuits using the TinkerCAD circuits software.

Participants will:

- Learn about what electrical engineering is and the different projects electrical engineers can work on.
- Construct simple circuits on TinkerCAD circuits.
- Learn what Ohm's Law is, how all electrical components and devices obey Ohm's laws, and how DC motor speed is dependent on voltage & resistors connected in series.

### 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!**

