

## BIG IDEAS

User needs and interests drive the design process.

Social, ethical, and sustainability considerations impact design.

Complex tasks require the sequencing of skills.

## Learning Standards

Curricular Competencies	Content
<p><i>Students are expected to be able to do the following:</i></p> <p><b>Applied Design</b></p> <p><i>Understanding context</i></p> <ul style="list-style-type: none"> <li>Engage in a period of research and <b>empathetic observation</b></li> </ul> <p><i>Defining</i></p> <ul style="list-style-type: none"> <li>Identify potential users and relevant contextual factors for a chosen design opportunity</li> <li>Identify criteria for success, intended impact, and any <b>constraints</b></li> <li>Determine whether activity is collaborative or self-directed</li> </ul> <p><i>Ideating</i></p> <ul style="list-style-type: none"> <li>Take creative risks in generating ideas and add to others' ideas in ways that enhance them</li> <li>Screen ideas against criteria and constraints</li> <li>Critically analyze and prioritize competing <b>factors</b> to meet community needs for preferred futures</li> <li>Maintain an open mind about potentially viable ideas</li> </ul> <p><i>Prototyping</i></p> <ul style="list-style-type: none"> <li>Choose a form for prototyping and develop a <b>plan</b> that includes key stages and resources</li> <li>Evaluate a variety of materials for effective use and potential for reuse, recycling, and biodegradability</li> </ul>	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> <li>design opportunities</li> <li><b>Ohm's law</b></li> <li><b>electrical theory</b> using parallel and series circuits</li> <li>breadboard circuitry</li> <li>production of simple circuits from schematic drawings</li> <li>electronic diagnostic and testing <b>instruments</b></li> <li>function and application of <b>components</b></li> <li>construction sequences involved in making a <b>working circuit</b></li> <li>function and use of <b>hand tools</b> and operation of <b>stationary equipment</b></li> <li><b>cases</b> for enclosing a circuit</li> <li>sequences involved in making a functional robot</li> <li>robot <b>elements</b></li> <li>block-based coding or logic-based programming for robotics</li> <li>programming platforms for robotics</li> <li>flow charts related to robotics behaviour</li> </ul>

Learning Standards (continued)

Curricular Competencies	Content
<ul style="list-style-type: none"> <li>• Prototype, making changes to tools, materials, and procedures as needed</li> <li>• Record <b>iterations</b> of prototyping</li> </ul> <p><b>Testing</b></p> <ul style="list-style-type: none"> <li>• Identify <b>sources of feedback</b></li> <li>• Develop an appropriate test</li> <li>• Conduct the test, collect and compile data, evaluate data, and decide on changes</li> </ul> <p><b>Making</b></p> <ul style="list-style-type: none"> <li>• Identify and use appropriate tools, <b>technologies</b>, materials, and processes</li> <li>• Make a step-by-step plan and carry it out, making changes as needed</li> <li>• Use materials in ways that minimize waste</li> </ul> <p><b>Sharing</b></p> <ul style="list-style-type: none"> <li>• Decide on how and with whom to <b>share product</b> and processes</li> <li>• Demonstrate product to users and critically evaluate its success</li> <li>• Identify new design goals</li> </ul> <p><b>Applied Skills</b></p> <ul style="list-style-type: none"> <li>• Demonstrate and document an awareness of precautionary and emergency safety procedures</li> <li>• Develop competency and proficiency in skills at various levels involving manual dexterity and circuitry</li> <li>• Identify the skills needed, individually or collaboratively, in relation to specific projects, and develop and refine them</li> </ul> <p><b>Applied Technologies</b></p> <ul style="list-style-type: none"> <li>• Choose, adapt, and if necessary learn more about appropriate tools and technologies to use for tasks</li> <li>• Evaluate <b>impacts</b>, including unintended negative consequences, of choices made about technology use</li> <li>• Evaluate the influences of land, natural resources, and culture on the development and use of tools and technologies</li> </ul>	