BIG IDEAS

Design for the life cycle includes consideration of social and **environmental impacts**.	Personal design interests require the evaluation and refinement of skills.	Tools and **technologies** can be adapted for specific purposes.

Learning Standards

Curricular Competencies	Content
Students are expected to be able to do the following: **Applied Design** ***Understanding context*** • Engage in a period of **user-centred research** and **empathetic observation** ***Defining*** • Establish a point of view for a chosen design opportunity • Identify potential users, intended impacts, and possible unintended negative consequences • Make inferences about premises and **constraints** that define the design space, and identify criteria for success • Determine whether activity is collaborative or self-directed ***Ideating*** • Generate ideas and add to others' ideas to create possibilities, and prioritize them for prototyping • Critically analyze how competing social, ethical, and sustainability considerations impact creation and development of solutions • Choose an idea to pursue based on success criteria and maintain an open mind about potentially viable ideas ***Prototyping*** • Choose a form for prototyping and develop a **plan** that includes key stages and resources • Analyze the design for the life cycle and evaluate its **impacts**	*Students are expected to know the following:* • simple circuit design and construction • **Ohm's law** • **Watt's law** • circuit board **manufacturing processes** • potential electrical hazards • measurement using advanced diagnostic and **testing instruments** • function and application of **common electronic components** • schematic diagrams • operation and application of **circuits** • purpose and operation of microcontrollers/microprocessors • strategies for isolating problems and implementing solutions in circuit construction • design for the life cycle

Learning Standards (continued)

Curricular Competencies	Content
• Visualize and construct prototypes, making changes to tools, materials, and procedures as needed • Record **iterations** of prototyping ***Testing*** • Identify and communicate with **sources of feedback** • Develop an **appropriate test** of the prototype, conduct the test, and collect and compile data • Apply information from critiques, testing results, and success criteria to make changes ***Making*** • Identify appropriate tools, technologies, materials, processes, cost implications, and time needed • Create design, incorporating feedback from self, others, and results from testing of the prototype • Use materials in ways that minimize waste ***Sharing*** • Determine how and with whom to **share** design and processes for feedback • Share the product with users to evaluate its success • Critically reflect on plans, products and processes, and identify new design goals • Analyze new possibilities for plans, products and processes, including how they or others might build on them **Applied Skills** • Apply safety procedures for themselves, co-workers, and users in both physical and digital environments • Individually or collaboratively identify and assess skills needed for design interests • Demonstrate competency and proficiency in skills at various levels involving manual dexterity and circuitry techniques • Develop specific plans to learn or refine identified skills over time	

Learning Standards (continued)

Curricular Competencies	Content
Applied Technologies • Explore existing, new, and emerging tools, technologies, and systems to evaluate suitability for design interests • Evaluate impacts, including unintended negative consequences, of choices made about technology use • Examine the role that advancing technologies play in electronics-related contexts	