

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
<p><i>Students are expected to be able to do the following:</i></p> <p>Applied Design</p> <p><i>Understanding context</i></p> <ul style="list-style-type: none"> Engage in a period of user-centred research and empathetic observation to understand design opportunities <p><i>Defining</i></p> <ul style="list-style-type: none"> Establish a point of view for a chosen design opportunity Identify potential users, intended impact, and possible unintended negative consequences Make decisions about premises and constraints that define the design space, and identify criteria for success Determine whether activity is collaborative or self-directed <p><i>Ideating</i></p> <ul style="list-style-type: none"> 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 design Choose an idea to pursue based on success criteria and maintain an open mind about potentially viable ideas <p><i>Prototyping</i></p> <ul style="list-style-type: none"> Choose a form for prototyping and develop a plan that includes key stages and resources Analyze the design for life cycle and evaluate its impacts Visualize and construct prototypes, making changes to tools, materials, and procedures as needed Record iterations of prototyping 	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> simple drafting design projects geometric construction to create drawings and images drawing management and problem solving using computer-assisted design (CAD) software use of scale and proportion when outputting to 3D models geometric dimensioning and tolerancing in both imperial and SI units. types, sizes, and applications of drawing media applicable visual formats and media for presenting design solutions technical problem solving using geometry, trigonometry, and algebra design for the life cycle ethics of cultural appropriation and plagiarism

Learning Standards (continued)

Curricular Competencies	Content
<p>Testing</p> <ul style="list-style-type: none"> • 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 <p>Making</p> <ul style="list-style-type: none"> • Identify appropriate tools, technologies, materials, processes, cost implications, and time needed • Create design, incorporating feedback from self, others, and testing prototypes • Use materials in ways that minimize waste <p>Sharing</p> <ul style="list-style-type: none"> • Decide on how and with whom to share design and processes for feedback • Share the product with users and critically evaluate its success • Critically reflect on their design thinking and processes, and identify new design goals • Identify and analyze new design possibilities, including how they or others might build on their concept <p>Applied Skills</p> <ul style="list-style-type: none"> • Apply safety procedures for themselves, co-workers, and users in both physical and digital environments • Identify and assess skills needed for design interests, individually or collaboratively, and develop specific plans to learn or refine them over time • Develop competency and proficiency in skills at various levels involving manual dexterity and drafting techniques <p>Applied Technologies</p> <ul style="list-style-type: none"> • Explore existing, new, and emerging tools, technologies, and systems to evaluate suitability for their design interests • Evaluate impacts, including unintended negative consequences, of choices made about technology use • Examine the role that advancing technologies play in drafting contexts 	

Big Ideas – Elaborations

- **environmental impacts:** including manufacturing, packaging, disposal, and recycling considerations

Curricular Competencies – Elaborations

- **user-centred research:** research done directly with potential users to understand how they do things and why, their physical and emotional needs, how they think about the world, and what is meaningful to them
- **empathetic observation:** aimed at understanding the values and beliefs of other cultures and the diverse motivations and needs of different people; may be informed by experiences of people involved; traditional cultural knowledge and approaches; First Peoples worldviews, perspectives, knowledge, and practices; places, including the land and its natural resources and analogous settings; experts and thought leaders
- **constraints:** limiting factors, such as task or user requirements, materials, expense, environmental impact
- **plan:** for example, pictorial drawings, sketches, flow charts
- **impacts:** including social and environmental impacts of extraction and transportation of raw materials; manufacturing, packaging, transportation to markets; servicing or providing replacement parts; expected usable lifetime; and reuse or recycling of component materials
- **iterations:** repetitions of a process with the aim of approaching a desired result
- **sources of feedback:** may include peers; users; First Nations, Métis, or Inuit community experts; other experts and professionals both online and offline
- **technologies:** tools that extend human capabilities
- **share:** may include showing to others, use by others, giving away, or marketing and selling

Content – Elaborations

- **drawings and images:** for example, basic sketches, orthographic projections, pictorials, working drawings
- **drawing management:** for example, managing layers, symbols, object groups, text styles, dimension styles
- **design for the life cycle:** taking into account economic costs, and social and environmental impacts of the product, from the extraction of raw materials to eventual reuse or recycling of component materials
- **cultural appropriation:** use of a cultural motif, theme, “voice,” image, knowledge, story, song, or drama, shared without permission or without appropriate context or in a way that may misrepresent the real experience of the people from whose culture it is drawn