BRITISH
COLUMBIA
Ministry of Education

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:	*Students are expected to know the following:*
Applied Design	• complex drafting design projects
Understanding context	• interrelationships among **complex drawings**
• Engage in a period of **user-centred research** and **empathetic observation** to understand design opportunities	• preparation of **detailed drawings**
Defining	• **components** of working drawings
• Establish a point of view for a chosen design opportunity	• computer-aided design (CAD) programs and other graphic **software management**
• Identify potential users, intended impact, and possible unintended negative consequences	• modifying existing geometrical design using CAD software
• Make decisions about premises and **constraints** that define the design space and develop criteria for success	• 3D modelling using advanced modelling techniques
• Determine whether activity is collaborative or self-directed	• file conversion between CAD and other applications
Ideating	• areas of drafting **specialization**
• Critically analyze how competing social, ethical, and sustainability considerations impact design	• **design for the life cycle**
• Generate ideas and add to others' ideas to create possibilities, and prioritize them for prototyping	• future career options in drafting design
• Evaluate suitability of possibilities according to success criteria, constraints, and potential gaps	• **interpersonal and consultation skills** to interact with clients
• Work with users throughout the design process	• ethics of **cultural appropriation** and plagiarism
Prototyping	
• Choose an appropriate form, scale, and level of detail for prototyping, and plan procedures	
• Analyze the design for the life cycle and evaluate its **impacts**	
• Visualize and construct prototypes, making changes to tools, materials, and procedures as needed	
• Record **iterations** of prototyping	

Learning Standards (continued)

Curricular Competencies	Content
Testing • Identify and communicate with **sources of feedback** • Develop an appropriate test of the prototype, conduct the test, and collect and compile data • Evaluate design according to 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 testing prototypes • Use materials in ways that minimize waste ***Sharing*** • Decide how and with whom to **share** or promote design, creativity, and processes • 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 **Applied Skills** • Apply safety procedures for themselves, co-workers, and users in both physical and digital environments • Identify and assess skills needed for design interests, and develop specific plans to learn or refine them over time • Demonstrate competency and proficiency in skills at various levels involving manual dexterity and complex drafting techniques **Applied Technologies** • 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 and analyze the role that changing technologies play in drafting contexts	

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

- **user-centred research:** research done directly with potential users to determine their wishes and requirements and understand how they do things
- **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
- **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

- **complex drawings:** for example, multi-view, working, development
- **detailed drawings:** for example, auxiliary views, sections, exploded assembly
- **components:** for example, bill of materials and schedules, tolerances, surface finishes
- **software management:** for example, short-cut and customization techniques, modifying geometry using control points
- **specialization:** for example, architectural, civil, mechanical, structural
- **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
- **interpersonal and consultation skills:** for example, professional communications, collaboration, follow-ups, courtesies, record keeping, ways to present visuals
- **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