**Area of Learning: Applied Design, Skills, and Technologies — Drafting Grade 12**

**BIG IDEAS**

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| 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**

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| **Curricular Competencies** | **Content** |
| *Students are expected to be able to do the following:*Applied DesignUnderstanding context* Engage in a period of **user-centred research** and **empathetic observation** to understand design opportunities

Defining* 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 develop criteria for success
* Determine whether activity is collaborative or self-directed

Ideating* Critically analyze how competing social, ethical, and sustainability considerations impact design
* Generate ideas and add to others’ ideas to create possibilities, and prioritize them for prototyping
* Evaluate suitability of possibilities according to success criteria, constraints, and potential gaps
* Work with users throughout the design process

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
 | *Students are expected to know the following:** complex drafting design projects
* interrelationships among **complex drawings**
* preparation of **detailed drawings**
* **components** of working drawings
* computer-aided design (CAD) programs and other graphic **software** **management**
* modifying existing geometrical design using CAD software
* 3D modelling using advanced modelling techniques
* file conversion between CAD and other applications
* areas of drafting **specialization**
* **design for the life cycle**
* future career options in drafting design
* **interpersonal and consultation skills** to interact with clients
* ethics of **cultural appropriation** and plagiarism
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**Learning Standards (continued)**

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| **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
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|  **APPLIED DESIGN, SKILLS, AND TECHNOLOGIES – DraftingBig Ideas – Elaborations Grade 12** |
| * **environmental impacts:** including manufacturing, packaging, disposal, and recycling considerations
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|  **APPLIED DESIGN, SKILLS, AND TECHNOLOGIES – DraftingCurricular Competencies – Elaborations Grade 12** |
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| * **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
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|  **APPLIED DESIGN, SKILLS, AND TECHNOLOGIES – DraftingContent – Elaborations Grade 12** |
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| * **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
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