**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 Design  Understanding 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 – Drafting Big Ideas – Elaborations Grade 12** |
| * **environmental impacts:** including manufacturing, packaging, disposal, and recycling considerations |

| **APPLIED DESIGN, SKILLS, AND TECHNOLOGIES – Drafting Curricular 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 |

| **APPLIED DESIGN, SKILLS, AND TECHNOLOGIES – Drafting Content – 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 |