Area of Learning: APPLIED DESIGN, SKILLS, AND TECHNOLOGIES — Drafting

Grade 12

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

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

Content

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
### Curricular Competencies

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<th>Content</th>
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<tr>
<td><strong>Testing</strong></td>
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<tr>
<td>• Identify and communicate with <strong>sources of feedback</strong></td>
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<td>• Develop an appropriate test of the prototype, conduct the test, and collect and compile data</td>
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<td>• Evaluate design according to critiques, testing results, and success criteria to make changes</td>
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<td><strong>Making</strong></td>
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<tr>
<td>• Identify appropriate tools, <strong>technologies</strong>, materials, processes, cost implications, and time needed</td>
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<td>• Create design, incorporating feedback from self, others, and testing prototypes</td>
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<td>• Use materials in ways that minimize waste</td>
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<td><strong>Sharing</strong></td>
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<td>• Decide how and with whom to <strong>share</strong> or promote design, creativity, and processes</td>
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<td>• Share the product with users and critically evaluate its success</td>
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<td>• Critically reflect on their design thinking and processes, and identify new design goals</td>
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<td>• Identify and analyze new design possibilities, including how they or others might build on their concept</td>
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<td><strong>Applied Skills</strong></td>
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<td>• Apply safety procedures for themselves, co-workers, and users in both physical and digital environments</td>
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<td>• Identify and assess skills needed for design interests, and develop specific plans to learn or refine them over time</td>
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<td>• Demonstrate competency and proficiency in skills at various levels involving manual dexterity and complex drafting techniques</td>
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<td><strong>Applied Technologies</strong></td>
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<td>• Explore existing, new, and emerging tools, technologies, and systems to evaluate suitability for their design interests</td>
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<td>• Evaluate impacts, including unintended negative consequences, of choices made about technology use</td>
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<td>• Examine and analyze the role that changing technologies play in drafting contexts</td>
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### 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 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

### Content – Elaborations
- **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