**Area of Learning: Applied Design, Skills, and Technologies — Metalwork Grade 11**

**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:*  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 inferences about premises and **constraints** that define the design space, and identify criteria for success * Determine whether activity is collaborative or self-directed   Ideating   * 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   Prototyping   * Identify and apply **sources of inspiration** * 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 | *Students are expected to know the following:*   * simple metalworking and design * orthographic and pictorial drawings * **measuring instruments** * **tables and charts** for tolerancing and machining * operation and safety of **stationary** **power equipment** and **stationary** **non-power equipment** in the processing of material * **size and lay out** of metal * types of **metals and alloys** and their characteristics * selection of metal type, size, structural shape, and finish for specific applications * ferrous and non-ferrous metals and their applications * **heat treatments** * **welding and cutting** * common **mechanical fastening methods** * forging and foundry applications * **design for the life cycle** * ethics of **cultural appropriation** in design process |

**Area of Learning: Applied Design, Skills, and Technologies — Metalwork Grade 11**

**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 * Apply information from 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** product and processes for feedback * Share the product to 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 the 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 metalwork techniques   Applied Technologies   * Explore existing, new, and emerging tools, technologies, and systems to evaluate suitability  for design interests * Evaluate impacts, including unintended negative consequences, of choices made about technology use * Examine the role that advancing technologies play in metalworking contexts |  |