**Area of Learning: Applied Design, Skills, and Technologies — Metalwork Grade 10**

**BIG IDEAS**

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| User needs and interests drive the design process. |  | Social, ethical,  and sustainability considerations  impact design. |  | Complex tasks require different technologies and tools at  different stages. |

**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 researchand **empathetic observation**   Defining   * Identify potential users and relevant contextual factors for a chosen design opportunity * Identify criteria for success, intended impact, and any **constraints** * Determine whether activity is collaborative or self-directed   Ideating   * Take creative risks in generating ideas and add to others’ ideas in ways that enhance them * Identify and use **sources of inspiration** * Screen ideas against criteria and constraints * Critically analyze and prioritize competing **factors** to meet community needs  for preferred futures * Maintain an open mind about potentially viable ideas   Prototyping   * Choose a form for prototyping and develop a **plan** that includes key stages and resources * Evaluate a variety of materials for effective use and potential for reuse, recycling,  and biodegradability * Prototype, making changes to tools, materials, and procedures as needed * Record **iterations** of prototyping | *Students are expected to know the following:*   * design opportunities * proper storage and organization of tools  and equipment * selection of metal for size, shape, and finish * common gauges of metal * identification of ferrous and non-ferrous materials and **carbon content** * start-up, shutdown, and handling procedures for compressed gas cylinders * **precision measurement** * **cutting threads** * mechanical fasteners and fastening methods * methods for laying out, forming,  and joining metal * precision grinding * computer numerical control (CNC) applications * reading and preparing drawings, plans,  and cutting lists * ethics of **cultural appropriation** in  design process |

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**Learning Standards (continued)**

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| **Curricular Competencies** | **Content** |
| Testing   * Identify **sources of feedback** * Develop an appropriate test * Conduct the test, collect and compile data, evaluate data, and decide on changes   Making   * Identify and use appropriate tools, **technologies**, materials, and processes * Make a step-by-step plan and carry it out, making changes as needed * Use materials in ways that minimize waste   Sharing   * Decide on how and with whom to **share** product and processes * Demonstrate product to users and critically evaluate its success * Identify new design goals   Applied Skills   * Demonstrate and document an awareness of precautionary and emergency safety procedures * Develop competency and proficiency in skills at various levels involving manual dexterity and metalwork techniques * Identify the skills needed, individually or collaboratively, in relation to specific projects,  and develop and refine them   Applied Technologies   * Choose, adapt, and if necessary learn more about appropriate tools and technologies  to use for tasks * Evaluate **impacts**, including unintended negative consequences, of choices made about technology use * Evaluate the influences of land, natural resources, and culture on the development and use  of tools and technologies |  |