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

**BIG IDEAS**

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| Mechanical service begins with operator safety. |  | Social, ethical, and sustainability considerations impact design. |  | Complex tasks require the sequencing of skills. |

**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 **research** and **empathetic observation**

Defining* Identify potential users and relevant contextual factors
* Identify criteria for success, intended impact, and any **constraints**
* Determine whether activity is collaborative or self-directed

Ideating* 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* Evaluate a variety of materials for effective use and potential for reuse, recycling, and biodegradability
* Make changes to tools, materials, and procedures as needed
 | *Students are expected to know the following:** internal and external combustion
* components of a combustion engine
* non-fuel power systems
* disassembly and assembly sequences
* **engine terminology**
* **lubrication** and **antifriction**
* hydraulic and pneumatic systems
* transfer and conversion of energy
* hand tools and power tools specific to mechanical repair and maintenance
* torques and tolerances for specific operations
* fasteners and fittings
* energy transmission and **conversion systems**
* technologies that reduce energy use and waste
* historical and potential future impact of energy, power, and transportation systems on society and the environment
* **alternate energy sources**
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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
* Iterate the design idea

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

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, mechanics, and maintenance
* 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
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|  **APPLIED DESIGN, SKILLS, AND TECHNOLOGIES – Power TechnologyCurricular Competencies – Elaborations Grade 10** |
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| * **research:** may include traditional cultural knowledge and approaches of First Peoples and others, secondary sources, collective pools of knowledge in communities and collaborative atmospheres
* **empathetic observation:** may include experiences; traditional cultural knowledge and approaches of First Peoples and those of other cultures; places, including the land and its natural resources and analogous settings; people, including users, experts, and thought leaders
* **constraints:** limiting factors such as task or user requirements, materials, expense, environmental impact
* **factors:** including social, ethical, and sustainability
* **sources of feedback:** may include First Nations, Métis, or Inuit community experts; keepers of other traditional cultural knowledge and approaches; peers, users, and other experts
* **appropriate test:** consider conditions, number of trials
* **technologies:** tools that extend human capabilities
* **share:** may include showing to others or use by others
* **product:** for example, a physical product, process, system, service
* **impacts:** personal, social, and environmental
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|  **APPLIED DESIGN, SKILLS, AND TECHNOLOGIES – Power TechnologyContent – Elaborations Grade 10** |
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| * **engine terminology:** relating to fundamentals of operation; classification and types
* **lubrication:** for example, oil, grease
* **antifriction:** for example, bearings, bushings
* **conversion systems:** for example,gear, sprocket, pulley, chain, cable
* **alternate energy sources:** for example,wind, solar, geothermal
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