

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
<p><i>Students are expected to be able to do the following:</i></p> <p>Applied Design</p> <p><i>Understanding context</i></p> <ul style="list-style-type: none"> Engage in a period of user-centred research and empathetic observation to understand design opportunities <p><i>Defining</i></p> <ul style="list-style-type: none"> 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 <p><i>Ideating</i></p> <ul style="list-style-type: none"> 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 <p><i>Prototyping</i></p> <ul style="list-style-type: none"> 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 	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> 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

Learning Standards (continued)

Curricular Competencies	Content
<p>Testing</p> <ul style="list-style-type: none"> 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 <p>Making</p> <ul style="list-style-type: none"> 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 <p>Sharing</p> <ul style="list-style-type: none"> 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 <p>Applied Skills</p> <ul style="list-style-type: none"> 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 <p>Applied Technologies</p> <ul style="list-style-type: none"> 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 	