

BIG IDEAS

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

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 research and empathetic observation <p><i>Defining</i></p> <ul style="list-style-type: none"> 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 <p><i>Ideating</i></p> <ul style="list-style-type: none"> 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 <p><i>Prototyping</i></p> <ul style="list-style-type: none"> 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 	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> 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

Learning Standards (continued)

Curricular Competencies	Content
<p>Testing</p> <ul style="list-style-type: none"> Identify sources of feedback Develop an appropriate test Conduct the test, collect and compile data, evaluate data, and decide on changes <p>Making</p> <ul style="list-style-type: none"> 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 <p>Sharing</p> <ul style="list-style-type: none"> Decide on how and with whom to share product and processes Demonstrate product to users and critically evaluate its success Identify new design goals <p>Applied Skills</p> <ul style="list-style-type: none"> 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 <p>Applied Technologies</p> <ul style="list-style-type: none"> 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 	