BIG IDEAS

The **design cycle** is an ongoing reflective process.	Personal design choices require self-exploration, collaboration, and 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*** • Conduct **user-centred research** to understand design opportunities and barriers ***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 ***Ideating*** • Identify gaps to explore a design space • 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 designed solutions to meet global needs for preferred futures • Work with users throughout the design process	*Students are expected to know the following:* • design opportunities • design cycle • **problem decomposition** • **structures** within existing code • ways to **modify** existing code to meet a particular purpose • **strategies** to predict effects of code modification • **pair programming** • programming language constructs to support input/output, logic, decision structure, and loops • **requirements** of a problem statement • **ways** to transform requirements into algorithms • translation of **design specifications** into source code • **tools** to aid in the development process • **pre-built libraries** and their **documentation** • inline commenting to document source code • **use of test cases** to detect logical or semantic errors • **computational thinking** processes • appropriate use of technology, including digital citizenship, etiquette, and literacy

Learning Standards (continued)

Curricular Competencies	Content
Prototyping • Identify and apply **sources of inspiration** and **information** • Choose an appropriate form, scale, and level of detail for prototyping, and plan procedures for prototyping multiple ideas • Analyze the design for the life cycle and evaluate its **impacts** • Construct prototypes, making changes to tools, materials, and procedures as needed • Record **iterations** of prototyping ***Testing*** • Identify feedback most needed and possible **sources of feedback** • Develop an **appropriate test** of the prototype • Collect feedback to critically evaluate design and make changes to product design or processes • Iterate the prototype or abandon the design idea ***Making*** • Identify appropriate tools, technologies, materials, processes, and time needed for production • Use **project management processes** when working individually or collaboratively to coordinate production ***Sharing*** • **Share** progress while creating to increase opportunities for feedback • Decide on how and with whom to share or promote their product, creativity, and, if applicable, **intellectual property** • Consider how others might build upon the design concept • Critically reflect on their design thinking and processes, and identify new design goals • Assess ability to work effectively both as individuals and collaboratively while implementing project management processes	

Learning Standards (continued)

Curricular Competencies	Content
Applied Skills • Apply safety procedures for themselves, co-workers, and users in both physical and digital environments • Identify and assess skills needed for design interests, and develop specific plans to learn or refine them over time **Applied Technologies** • Explore existing, new, and emerging tools, **technologies**, and systems to evaluate their suitability for their design interests • Evaluate impacts, including unintended negative consequences, of choices made about technology use • Analyze the role technologies play in societal change • Examine how cultural beliefs, values, and ethical positions affect the development and use of technologies	