# TECHNOLOGY EXPLORATIONS 10

## Description

Technology Explorations 10 is designed to provide flexibility for teachers and students while ensuring that the rigorous provincial curriculum standards are met. Based on students' interests and strengths and on course offerings, teachers may use Curricular Competencies from Technology Explorations 10 with a combination of Content provided from technology education in other areas. It is expected that at least six topics from the Content column will be selected from at least two curricular areas to best meet the needs of the students. Note that the origin of each Content learning standard in Technology Explorations 10 is provided in parentheses.

Examples of Content learning standards:

- drafting styles, including perspective, mechanical drafting, and architectural drawing (Drafting 10)
- techniques for stock breakout and woodworking using a variety of tools and equipment, including stationary power equipment (Woodwork 10)
- construction sequences involved in making a working circuit (Electronics and Robotics 10)

  

# BIG IDEAS

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|---|---|---|
| User needs and interests drive the design process. | Social, ethical, and sustainability considerations impact design. | Technologies help us accomplish many specific tasks in our lives. |

## Learning Standards

| Curricular Competencies | Content |
|---|---|
| *Students are expected to be able to do the following:*<br>**Applied Design**<br>***Understanding context***<br>• Engage in a period of research and **empathetic observation**<br>***Defining***<br>• Identify potential users and relevant contextual factors<br>• Identify criteria for success, intended impact, and any **constraints** for a chosen design opportunity<br>• Determine whether activity is collaborative or self-directed<br>***Ideating***<br>• Take creative risks in generating ideas and add to others' ideas in ways that enhance them<br>• Identify and use **sources of inspiration**<br>• Screen ideas against criteria and constraints<br>• Critically analyze and prioritize competing **factors** to meet community needs for preferred futures<br>• Maintain an open mind about potentially viable ideas<br>***Prototyping***<br>• Choose a form for prototyping and develop a **plan** that includes key stages and resources | *Students are expected to know at least six of the following from at least two curricular areas:*<br>• project design opportunities (Woodwork 10)<br>• ethics of **cultural appropriation** in design process (Woodwork 10, Metalwork 10)<br>• **techniques** for stock breakout and woodworking using a variety of tools and equipment, including **stationary power equipment** (Woodwork 10)<br>• functions, uses, and role of portable and stationary power equipment in the creation of a project (Woodwork 10)<br>• function and use of hand tools (Woodwork 10)<br>• proper storage and organization of tools and equipment (Metalwork 10)<br>• selection of metal for size, shape, and finish (Metalwork 10)<br>• start-up, shutdown, and handling procedures for compressed gas cylinders (Metalwork 10)<br>• mechanical fasteners and fastening methods (Metalwork 10)<br>• methods for laying out, forming, and joining metal (Metalwork 10)<br>• computer numerical control (CNC) applications (Metalwork 10) |

## Learning Standards (continued)

| Curricular Competencies | Content |
|---|---|
| • Evaluate a variety of materials for effective use and potential for reuse, recycling, and biodegradability<br>• Prototype, making changes to tools, materials, and procedures as needed<br>• Record **iterations** of prototyping<br>***Testing***<br>• Identify **sources of feedback**<br>• Develop an appropriate test<br>• Conduct the test, collect and compile data, evaluate data, and decide on changes<br>***Making***<br>• Identify and use appropriate tools, **technologies**, materials, and processes<br>• Make a step-by-step plan and carry it out, making changes as needed<br>• Use materials in ways that minimize waste<br>***Sharing***<br>• Decide on how and with whom to **share product** and processes<br>• Demonstrate product to users and critically evaluate its success<br>• Identify new design goals<br>**Applied Skills**<br>• Demonstrate and document an awareness of precautionary and emergency safety procedures<br>• Develop competency and proficiency in skills at various levels involving manual dexterity and specialized area of focus<br>• Identify the skills needed, individually or collaboratively, in relation to specific projects, and develop and refine them | • **electrical theory** using parallel and series circuits (Electronics and Robotics 10)<br>• production of simple circuits from schematic drawings (Electronics and Robotics 10)<br>• electronic diagnostic and testing **instruments** (Electronics and Robotics 10)<br>• construction sequences involved in making a **working circuit** (Electronics and Robotics 10)<br>• function and use of **hand tools** and operation of **stationary equipment** (Electronics and Robotics 10)<br>• sequences involved in making a functional robot (Electronics and Robotics 10)<br>• robot **elements** (Electronics and Robotics 10)<br>• block-based coding or logic-based programming for robotics (Electronics and Robotics 10)<br>• programming platforms for robotics (Electronics and Robotics 10)<br>• internal and external combustion (Power Technology 10)<br>• disassembly and assembly sequences (Power Technology 10)<br>• **engine terminology** (Power Technology 10)<br>• hydraulic and pneumatic systems (Power Technology 10)<br>• transfer and conversion of energy (Power Technology 10)<br>• energy transmission and **conversion systems** (Power Technology 10)<br>• hand tools and power tools specific to mechanical repair and maintenance (Power Technology 10)<br>• **alternate energy sources** (Power Technology 10)<br>• drawing **standards** and **conventions** (Drafting 10) |

## Learning Standards (continued)

| Curricular Competencies | Content |
|---|---|
| **Applied Technologies**<br>• Choose, adapt, and if necessary learn more about appropriate tools and technologies to use for tasks<br>• Evaluate **impacts**, including unintended negative consequences, of choices made about technology use<br>• Evaluate the influences of land, natural resources, and culture on the development and use of tools and technologies | • scales for different **types** of drawings (Drafting 10)<br>• drafting styles, including perspective, mechanical drafting, and architectural drawing (Drafting 10)<br>• modelling using computer-aided design (CAD) and computer-aided manufacturing (CAM) software (Drafting 10)<br>• coding for creating 3D representations of design solutions (Drafting 10) |

- **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
- **sources of inspiration:** may include personal experiences, exploration of First Peoples perspectives and knowledge, the natural environment, places, cultural influences, users and experts
- **factors:** including social, ethical, and sustainability
- **plan:** for example, pictorial drawings, sketches, flow charts
- **iterations:** repetitions of a process with the aim of approaching a desired result
- **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
- **technologies:** tools that extend human capabilities
- **share:** may include showing to others or use by others, giving away, or marketing and selling
- **product:** for example, a physical product, process, system, service, designed environment
- **impacts:** personal, social, and environmental

- **cultural appropriation:** use of a cultural motif, theme, "voice", image, knowledge, story, song, or drama, shared without permission or without appropriate context or in a way that may misrepresent the real experience of the people from whose culture it is drawn
- **techniques:** for example, shaping, laminating, turning, joining, finishing
- **stationary power equipment:** for example, jointer, planer, lathe, mitre saw, table saw, band saw, thickness sander, drill press, scroll saw, mortise machine, radial arm saw, panel saw
- **electrical theory:** for example, source, load, control, conductor, voltage, current, resistance, insulator, alternating current (AC), and direct current (DC)
- **instruments:** for example, multimeter, power supplies, test probes, signal-generating devices
- **working circuit:** for example, current, amperage, load, resistance, power, control
- **hand tools:** for example, screwdriver, pliers, cutter, wire stripper, desoldering pump, snips, punch, soldering iron
- **stationary equipment:** for example, box and pan brake, bar folder, shears, punches, drill press, strip heater
- **elements:** for example, input/output sensors, effectors, control systems, movement
- **engine terminology:** relating to fundamentals of operation; classification and types
- **conversion systems:** for example, gear, sprocket, pulley, chain, cable
- **alternate energy sources:** for example, wind, solar, geothermal
- **standards:** for example, line types, line weights
- **conventions:** for example, layout, drawing set-up
- **types:** for example, plans, section, detail