TECHNOLOGY AND THE SKILLED TRADES, GRADE 10, TAS2O PROJECT PLAN 2026

The Ontario Science Centre and the Ontario Council for Technology Education, with support from the Ontario Ministry of Education, are pleased to present this project plan for Technology and the Skilled Trades (TAS2O).

Project Plan Introduction

This resource is designed to support educators in implementing TAS2O: Technology and the Skilled Trades in accordance with the expectations outlined in the 2024–25 Technological Education curriculum. The learning experiences herein reflect the curriculum's emphasis on hands-on, experiential learning, technological problem solving, and real-world applications of technology.

In this course, students will engage with the Engineering Design Process (EDP) and related skills, as well as the fundamental technological skills development, impacts of technology, and careers. Through practical, project-driven activities, learners will explore the engineering design process, apply safe and effective use of tools and technologies, and develop foundational technological skills that support effective problem solving across broad-based technology areas.

This resource includes structured activities that align with course expectations and support students as they:

- apply the engineering design process to design, build and evaluate solutions to authentic challenges
- develop technical and communication skills using appropriate tools, equipment and techniques
- examine the impacts of technology on society, the environment and the economy
- investigate career opportunities in technology and the skilled trades, including education and training pathways
- integrate STEM knowledge with hands-on design, fabrication, and innovation practice

The sequence of tasks will encourage students to connect classroom learning to real-world contexts, build confidence in technological proficiency, and consider how their work contributes to sustainable, ethical and effective solutions. The ultimate aim is to enable students to see themselves as capable contributors to technological innovation, skilled practice and career pathways in a rapidly evolving world.

Ontario Science Centre (OSC) and Ontario Council for Technology Education (OCTE) remain committed to providing educators with curriculum-aligned, practical resources that support meaningful implementation of TAS2O across diverse learning environments.

All projects are grounded in a consistent engineering design process. This approach will ensure that every student, in any BBT area, will develop curiosity about the discipline while engaging in a structured cycle of understanding, ideation, iteration and prototyping. Through this process, learners will apply appropriate tools, terminology and safety practices, while building the fundamental technological concepts and skills expected across all BBT programs.

Included in this document are sample activities that are designed to serve as a practical framework for your classroom. Given the vast scope of the TAS sectors, this resource is intended to be flexible; it can be implemented in its original form or customized to align with your classroom's specific equipment and student learning goals.

For a broader library of project ideas, educators are encouraged to consult the Ontario Council for Technology Education website at **OCTE.ca**.

Cycle 1: Technology, Society and Sustainability

This cycle explores how technological developments impact people, communities and the environment. TAS helps students examine how technology is designed to meet human needs while considering safety, ethics and environmental responsibility. Through hands-on projects and the engineering design process, students will learn to make informed design choices, evaluate materials and processes and understand the social and environmental consequences of technology. This focus helps students develop critical thinking, problem-solving and transferable skills while encouraging responsible, sustainable approaches to technology in everyday life and future careers.

Cluster 1: Technology Impact Case Study

Students will research a piece of technology used in a trade's sector and analyze its social, environmental and ethical impacts. By examining positive and negative effects, students will develop an understanding of how technology influences daily life, workplaces and overall sustainability. The case study requires students to assess consequences and consider responsible use of technology.

Resource:
Robotics and Emerging Technologies in a Broad-Based Technology

Lesson Overview

Students will explore the role of robotics with examples in each BBT and will consider their effect on the labour force and humanity. They will reflect on their learning making connections to transferable skills, sustainable approaches and future careers.

Students will:

- design a prototype, conduct an investigation, or perform an audit of a small product or service
- apply fundamental technological concepts, consider accessibility, sustainability and user needs, and establish evaluation criteria to evaluate success
- investigate technological solutions across multiple broad-based technologies by examining user needs, societal and environmental impacts, diverse Canadian contributions and related career pathways in technological fields and the skilled trades
- make connections to how diverse communities, including First Nations, Métis and Inuit peoples have drawn on various knowledge systems to find innovative approaches to technological problem solving and sustainability

Overall Expectations

A1. Initiating and Planning
A2. Designing and Performing
A3. Analyzing and Refining
B1. Fundamentals of Technological Development
B3. Careers and Pathways in Technology and the Skilled Trades

Lesson Plan

Lesson 1: Introduction and Research Phase (1 class period)

- Students will research the role of robotics within three sectors and determine their effect on the labour force, sustainability, and consider the consequences of using the technology.

Lesson 2: Investigate and Prototype (1 class period)

- Students will investigate a small service or product and consider which BBT they would want to build a prototype for. During this stage, students will make connections to the fundamental concepts.
- Students will consider the user needs and technological impact.

Lesson 3: Prototype (2 class periods)

- Students will consider the components being used and prioritize recycled materials in the building of the prototype. Students will incorporate one robotic or automated component into the design.

Lesson 4: Reflecting and Presenting Phase (1 class period)

- Students will complete a reflection and do a presentation based on their findings. They will make connections to transferable skills, and consider the environment and sustainability.
- Students will complete a “failure log” to explain the steps that didn’t work and the changes that were made.

Cluster 2: Sustainable Redesign Challenge

Students will apply the engineering design process to sustainably redesign an existing product or process. By justifying material choices, waste reduction strategies or energy efficiency improvements, students will connect technological decision-making to sustainability and responsible innovation.

Lesson Overview

Students will apply the engineering design process to redesign hydroponics aligned to Green Industries. The project emphasizes sustainable innovation, requiring students to justify decisions related to materials, energy use, waste reduction and system efficiency. Students will integrate technological problem solving, environmental stewardship and financial planning to develop a viable mobile service model.

Students will:

- plan and create or redesign a product using sustainable materials, address challenges with critical thinking and reflect on the local and global impacts of their technological choices
- research and assess local and global impacts of various technological innovations on the environment and the economy
- identify hazardous waste generated in technology courses
- identify proper safety and environmental protocols, including completing a recognized safety quiz or certification
- research how waste materials are managed in technology and skilled trades careers and explore innovative ways waste can be reduced, reused or converted into energy or other positive applications

Overall Expectations

A2. Designing and Performing

A3. Analyzing and Refining

A4. Applying Health and Safety Principles

B1. Fundamentals of Technological Development

B2. Impacts of Technology

Lesson Plan

Lesson 1: Hydroponic Research Project (2 class periods)

- Students will research the environmental benefits of using hydroponics as a food production method.
- Students will identify the different components of the hydroponic system and investigate how they could further improve the system.

Lesson 2: Seed Propagation (2 class periods)

- Students will investigate which plants are native to the region and suitable for the growing conditions. Students should consider traditional plants used by the local people.
- Students will select the seeds of their choosing and propagate them in preparation for their growing system.

Lesson 3: Build a Hydroponic Water Culture System (4 class periods)

- Students will use the engineering design process to design a hydroponic growing system that incorporates sustainable resources or repurposes materials found within the classroom.

Lesson 4: Hydroponic System Care and Maintenance (2 class periods)

- Students will follow safety protocols to continue to maintain and care for the system.
- Students will apply numeracy skills to calculate reservoir levels and nutrient requirements.
- Students will document what they are doing to care for the towers using a daily log.

Lesson 5: Harvesting Lettuce (2 class periods)

- Students will complete a report on the environmental impacts of hydroponic growing and the sustainability of their system.

Cluster 3: Technology Choices and Consumer Awareness Reflection

Through analysis of real-world consumer products and practices, students will explore how demand influences technological production and sustainability. The reflective component allows students to connect curriculum concepts to their own lives and demonstrate an understanding of responsible and informed technological choices.

Lesson Overview

Students will be introduced to different roof and house styles in this project. Before potentially building a roof on a shed, model house or building, students will be able to identify different roof styles, house styles and identify their characteristics.

Students will:

- examine a common product, service or technological process and analyze its design, materials, tools or methods
- consider factors such as cost, sustainability, safety, durability and user needs
- investigate how consumer demand, trends and marketing influence technological development within their broad-based technology focus area, and reflect on how consumers can make informed choices and how technologists have a responsibility to design and deliver products or services that balance performance, cost and social responsibility
- reflect on a technological solution or project they have engaged with and assess its short- and long-term impacts

Overall Expectations

A1. Initiating and Planning
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B1. Fundamentals of Technological Development
B2. Impacts of Technology

Lesson Plan

Lesson 1: Community Investigation (2 class periods)

- Students will photograph five different roof and house styles within their immediate community.
- Students will gather their findings and associated metadata.

Lesson 2: Style Identification (1 class period)

- Students will identify the specific building and roof style of each of their photographed examples.

Lesson 3: Roof and House Style Quiz (1 class period)

- Students will correctly identify the roof and housing types.

Lesson 4: Building a Truss (2 class periods)

- Students will use the truss diagram to construct a truss section, demonstrating proper tool use and mathematical applications.
- Students will properly identify the parts of the truss.

Cycle 2: Design Thinking, Problem Solving and Planning

Design Thinking, Problem Solving and Planning is central to the Grade 10 course as it guides students in developing thoughtful and effective technological solutions. Students will learn to identify real-world problems, conduct research, generate and test ideas and refine their designs using the engineering design process. This focus encourages creativity, critical thinking and evidence-based decision-making while reinforcing that successful technology is built through planning, testing and reflection. By developing these transferable skills, students will gain confidence in tackling challenges and be prepared for future learning, careers and everyday problem solving.

Cluster 1: Empathy-Based Design

Students will learn to identify user needs through investigation and inquiry, with a specific focus on accessibility, inclusivity and diverse perspectives.

Lesson Overview

Students will design and prototype innovative solutions to improve the quality of life for seniors, such as ergonomic furniture or smart home devices. Students will learn the principles of user-centred design. This will foster empathy by creating products tailored to seniors' needs. Students can collaborate on projects that involve redesigning spaces to be more senior-friendly.

Students will:

- begin the engineering design process and identify a problem by investigating user needs, design considerations and accessibility requirements
- develop related vocabulary (for example, ergonomics, dietary restrictions, AODA compliance, user interface contrast)
- explore real-world examples of ineffective or exclusive designs, identifying the ways these designs create obstacles for users
- relate their findings to user needs and propose improvements through a presentation, redesign sketch or prototype
- design a user experience (UX) questionnaire to gather information about a prospective user's feelings, thoughts, needs, preferences and behaviours related to a product or service
- create a plan to improve a specific design, service or system using relevant data they have collected
- explain their solution using language that focuses on accessibility and inclusion

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A1. Initiating and Planning
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Lesson Plan

Lesson 1: Introduction (1 class period)

- Students will discuss user-centred design and the specific needs of seniors.
- The teacher will introduce the process of designing products with specific user needs in mind.

Lesson 2: Research Phase (1-2 class periods)

- Students will conduct research and interview seniors to understand their preferences, needs and identify potential product ideas.
- Students will research existing products and identify their shortcomings.

Lesson 3: Design Phase (1-2 class periods)

- Students will brainstorm and sketch ideas for new senior-friendly products.
- The teacher will review designs for usability and effectiveness.

Lesson 4: Prototyping Phase (1-2 class periods)

- Students will create detailed designs and prototypes.
- Students will test prototypes with seniors and gather feedback for improvements.

Lesson 5: Presentation and Feedback (1-2 class periods)

- Students will present their final designs and prototypes.
- Students will conduct a reflection session on the design process and empathy development.

Cluster 2: Speaking the Lingo

Students will explore how technical ideas, information and processes are communicated across a variety of technological disciplines.

Lesson Overview

Students will be introduced to the fundamentals of concrete and its vital role in construction. Through a two-part lesson, they will first explore the properties and uses of concrete in everyday life. Next, they will apply their numeracy skills to a hands-on activity, learning how to accurately calculate the dimensions and volume required for concrete foundations, a critical skill for the skilled trades.

Students will:

- explore industry-standard formats (for example, metric vs. imperial systems, ISO 129, IPv4 protocol, DXF or DWG, point-of-sale systems) to understand their intended use, the fields that rely on them and the benefits and limitations of each standard
- apply a structured revision and feedback process to a technical planning document (for example, drawing, storyboard or process plan) and use notes or annotations to identify strengths and suggest improvements
- improve the accuracy, clarity and overall quality of the document
- develop familiarity with industry standards through the creation of planning documents (for example, specification sheets, blueprints, bill of materials, flowcharts, storyboards, drawings)
- consider industry-specific vocabulary and best practices (for example, codes, nomenclature, WHMIS symbols, terminology)
- practise their communication skills by delivering clear verbal instructions
- form pairs without seeing each other's work and take turns completing a task (for example, assembling a simple LEGO model, completing a puzzle or combining ingredients) guided only by their partner's spoken directions
- evaluate examples of documentation of varying quality and detail to identify the key elements of effective documentation

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B3. Careers and Pathways in Technology and the Skilled Trades

Lesson Plan

Lesson 1: Learning and Understanding the Industry Standards (1-2 class periods)

- Students will be introduced to concrete in our everyday lives and its various purposes.
- Students will then complete a concrete introduction worksheet.

Lesson 2: Connecting Industry Standards to Numeracy (1-2 class periods)

- Students will be introduced to concrete calculations for pouring foundations.
- They will gain an understanding of the importance of foundations and how they are calculated.
- Numeracy skills will be used to help them come to the conclusions for each required foundation size.
- Teachers will direct conversations during the presentation of the foundation information website to help them better understand the needs and purpose of foundations and why the calculations are important.

Cluster 3: From Idea to Plan

Students will develop strategies, organizational skills and resiliency to structure their approach when moving from an initial idea to a planned solution.

Resource:
Design a Tiny House

Lesson Overview

As urban density increases and environmental concerns grow, the demand for high-efficiency, small-scale housing has skyrocketed. In this challenge, students will act as Junior Architectural Designers tasked with designing a Micro-Living Module (Tiny House) that does not exceed 300 square feet (27.87 square metres).

Students must balance the lingo of technical drafting with the resiliency required to fit all essential human needs (sleeping, cooking, hygiene and storage) into a highly constrained footprint.

Students will:

- apply project management methods and approaches (for example, Scrum boards, Gantt charts, Kanban, 80/20 rule) to complete a specified task
- use these tools to organize workflow, manage resources and reflect on how project management supports successful outcomes
- explore and select materials and resources for a design or project based on their properties, characteristics, environmental impact, cost or both
- establish and justify evaluation criteria for a minimum viable product (MVP) of their chosen solution
- co-create a safety checklist with their instructor

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Lesson Plan

Lesson 1: Research and Preliminary Design (2-3 class periods)

- Students will be introduced to the concept of a tiny home.
- They will then research options, features and finishes they would like in their own home, which they will later design.
- Students will include a Bill of Materials throughout the project and refine as needed, when possible.

Lesson 2: Blueprinting and Technical Documentation (4-5 class periods)

- Students will create rough sketches of their design.
- Once the sketches are approved, they will then create blueprints using CAD or similar software.

Lesson 3: Shop Fabrication and Modeling (5-6 class periods)

- Students will build a model of their home using the plans they created earlier and provided materials.
- Students will reflect on their Bill of Materials, and consider what they didn't take into account, what the cost of making changes would be, and how these changes affect the overall plan.

Cycle 3: Technical Skills, Tools and Fabrication

Technical Skills, Tools and Fabrication are a key focus in the Grade 10 Technology and the Skilled Trades course as students learn how ideas are transformed into tangible products. Through hands-on experiences, students will develop practical skills using a variety of tools, equipment, materials and fabrication techniques. This cycle emphasizes precision, measurement and quality craftsmanship while reinforcing safe and responsible tool use, including digital tools. Building technical competence supports problem solving, confidence and independence and prepares students for future pathways in technology, skilled trades and design-related fields.

Cluster 1: Responsible Tool Operation

Students will learn proper tool selection, handling and safety protocols while completing simple fabrication tasks.

Resource:
Risk Assessment Activity — Transportation Technology

Lesson Overview

In this activity, students will be guided to perform risk assessments on various tasks and jobs that staff and students would normally perform in any broad-based technology classroom.

Students will:

- identify possible safety hazards, safety protocols and personal protective equipment (PPE) through the creation of a scaled floor plan of the classroom, workshop or salon
- be provided opportunities for design improvements using industry safety guidelines
- identify and demonstrate safe work habits while using a variety of tools commonly found in technology classrooms (for example, hand tools, testers, portable power tools, machines)
- learn, through guided demonstrations and practice, correct tool selection, handling, setup and shutdown procedures, with a focus on minimizing risk and preventing damage to materials and equipment

- apply basic fabrication, design and styling techniques (for example, measuring, cutting, drilling, fastening, sanding, mixing) to complete simple hands-on tasks while following established safety rules, signage and PPE requirements (note: emphasis will be placed on responsible tool use, proper posture and accuracy)
- document their fabrication process using appropriate technical terminology and reflect on how safe practices and attention to detail contribute to product quality, efficiency and sustainability
- explore how safety standards and workplace procedures support long-term health, environmental responsibility and professional practice in skilled trades and technology-related careers

Overall Expectations

A1. Initiating and Planning
A2. Designing and Performing
A3. Analyzing and Refining
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B1. Fundamentals of Technological Development
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Lesson Plan

Lesson 1: Introduction to Health and Safety (1-2 class periods)

- Students walk around the classroom to find potential safety risks.
- Students compare what they see to the chart and add any risks not listed.
- Students refer to questions on the log or chart and consider risk, harm and action to be taken.

Lesson 2: Charting Risk and Preventing Injuries (5-6 class periods)

- Students will research health and safety websites and analyze if they are well-respected in the industry or have notable published works.
- Students will decipher information from their research and use the chart to log information connected to harm, injury prevention, and action needed to be taken.

Lesson 3: Sharing your Learning (1-2 class periods)

- Students will share their documents as either a full class presentation or working in pairs, comparing the research and making any refinements, if needed.

Cluster 2: Precision in Fabrication

Students will develop the skills in measuring, marking and creating components with accuracy while following plans and quality standards.

Lesson Overview

Students will learn how to read measurements in both fractions and decimals, change between them, and use various measuring tools to measure accurately.

Students will:

- develop proficiency in precise measurement, marking and layout techniques using industry-appropriate tools
- select appropriate units and tolerances to ensure components or parts meet design specifications for the final product
- follow detailed, instructor-provided instructions to create components, documenting each stage of development and noting any modifications (note: emphasis will be placed on interpreting instructions, sequencing steps and maintaining consistency across multiple measurements)
- evaluate the quality and performance of their components using basic quality-control methods and identify sources of error and areas for improvement
- consider, through reflection, how materials, tools, methods or processes will influence performance, sustainability and the social and environmental impact of their work

Overall Expectations

A1. Initiating and Planning
A2. Designing and Performing
A3. Analyzing and Refining
A4. Following Health and Safety Practices
B1. Fundamentals of Technological Development
B2. Impacts of Technology

Lesson Plan

Lesson 1: Convert It! (2-3 class periods)

- Students will complete a teacher-provided chart converting between fractional and decimal inches.
- Students will compare the differences or similarities of measuring and consider why you would choose one method over another.

Lesson 2: Measure It! (2-3 class periods)

- Students will measure given objects (or scrap materials) in both fractional and decimal inches.
- Students will justify why they chose to measure in fractions or decimals and explain which method was easier or more difficult.

Lesson 3: Exit Card (1 class period)

- Students will demonstrate their learning through the use of a Kahoot.

Cluster 3: Product, Assemble, Refine

Students will apply fabrication, assembly and problem-solving skills to create functional products or prototypes, refining designs iteratively and collaborating with peers.

Lesson Overview

Students will explore the engineering design process by creating a personalized project that highlights skills in the construction sector. They will begin with an ideation session and research to develop a design, apply their knowledge of precision measurement and safety standards while using a variety of machines and tools in the shop, and construct a prototype or product using materials they have selected. The project will conclude with a reflection on their design, construction process, and a consideration of how the skills they developed relate to various careers and pathways in the skilled trades.

Students will:

- identify and demonstrate appropriate fabrication techniques and tool use
- learn, through guided practice, how to select and handle tools safely, prepare materials and follow procedures to produce accurate and functional products or prototypes
- apply iterative problem solving and testing to improve designs (note: emphasis will be placed on evaluating performance, enhancing durability and documenting changes to improve overall product quality)
- collaborate effectively in teams to plan, design and build projects
- practise communication, task management and share responsibility for safety, quality and project outcomes
- reflect on the social, environmental and ethical impacts of design choices and materials
- connect technical skills to real-world applications and explore how professional standards, craftsmanship and responsible practices contribute to success

Overall Expectations

A1. Initiating and Planning
A2. Designing and Performing
A3. Analyzing and Refining
A4. Applying Health and Safety Practices
B1. Fundamentals of Technological Development
B2. Impacts of Technology

Lesson Plan

Lesson 1: Introduction and Ideation Minds On (1-2 class periods)

- Students will watch the video "10 Amazing Scrap Wood Project Ideas | Beginner Woodworking Projects" (or similar), which highlights the design and construction process from start to finish.
- Following the video, the teacher will lead a class discussion on the various stages of the engineering design process demonstrated in the video (ideation, planning, material selection, construction and evaluation).
- Students will discuss the constraints and available materials.
- They will be given time for ideation and to research possible project ideas.
- The final goal will be to generate a rough idea for their design using the engineering design process steps.
- Students will share their project ideas to the class and receive feedback and then make adjustments.

Lesson 2: Project Planning (2-3 class periods)

- A brief discussion will be held about the importance of matching a design idea to the available materials and resources. The teacher will emphasize that design is a cyclical process.
- Students will be asked to seek out materials to use for construction. They will physically go into the shop, inspect the available lumber and other resources, and choose the specific pieces they intend to use.
- Based on the materials they have found, students will make modifications and further ideation to their initial design. This is a critical step where they might adjust dimensions or construction methods based on what is available.
- Students will create a final, detailed plan for their project, which could include a measured drawing, a cut list or a sequence of steps.
- Machine demonstrations will be delivered for each step.
- Students will present their final plan and the materials they have selected to the teacher for approval. This check-in ensures that the project is safe and that the design is feasible before construction begins.

Lesson 3: Construction and Reflection (3-4 class periods)

- Students will receive approval for their plans, then begin construction of the project. This will involve using the tools and machines available in the shop to cut, shape and assemble their project according to their final plan.
- The teacher will provide ongoing supervision, feedback and skill demonstrations as needed throughout this phase, with a strong emphasis on proper safety procedures.
- Once the students have completed their construction, they will be asked to write a reflection report on their project. This can be done through the provided self-reflection form, a written paragraph or a final presentation to the class. The reflection will be an opportunity for students to analyze their design choices, document their challenges and reflect on the skills they have acquired.

Cycle 4: Project Documentation and Communication

Project Documentation and Communication is a central focus in TAS2O as it allows students to apply their technical skills, research and problem-solving abilities in meaningful, real-world contexts. Through design projects, students will follow the engineering design process to plan, create, test and refine solutions, while documenting their thinking and progress. Students might use this process to plan a recipe, design a hairstyle, build a digital project or create a prototype, all of which involve problem solving, testing and refining ideas. Emphasis on communication helps students clearly share ideas, designs and reflections using sketches, models, digital tools and presentations. This focus builds collaboration, organization and professional communication skills that are essential for success in technology-based pathways, workplaces and everyday life.

Cluster 1: Documenting the Engineering Design Process

Students will record planning, research, design ideas and progress using journals, sketches, diagrams and digital tools while following the engineering design process

Lesson Overview

Students will learn to make safe, ethical and knowledge-based decisions both online and offline. They will learn how to identify strategies, resources and support available in regards to internet safety, as well as how to apply ergonomic safety standards in their day-to-day lives and while completing various Communication Technology tasks.

Students will:

- create a detailed record of the steps taken in their project, including research, planning, prototyping, testing and refinement
- apply technical vocabulary and visual documentation to communicate their process
- identify challenges they encountered during the project and explain the strategies they used to address them (including the use of digital or AI-assisted tools to explore possible solutions)
- connect their project documentation to larger technological ideas, including ethical, social and environmental impacts

Overall Expectations

A1. Initiating and Planning
A2. Designing and Performing
A3. Analyzing and Refining
A4. Following Health and Safety Practices
B1. Fundamentals of Technological Development
B3. Careers and Pathways in Technology and the Skilled Trades

Lesson Plan

Lesson 1: Class Presentation and Demonstration of Knowledge (1 class period)

- Students will describe how they, their friends, or their family are affected (positively and negatively) by existing, new or emerging technologies.
- Students will describe what influences technology design and the desire to be connected.
- Students will describe and apply safe work practices during their daily tasks, including identifying ergonomic hazards, identifying reliable sources of information and following safety protocols.
- Students will complete and submit a paper handout by the end of the class.

Cluster 2: Presenting Your Work

Students will clearly communicate project ideas, design decisions and final outcomes through oral, visual or multimedia presentations.

Lesson Overview

Students will plan, design, create and maintain a community garden in collaboration with local seniors or community partners. Using principles of sustainable gardening and the engineering design process, students will develop empathy, environmental awareness and practical horticultural skills while creating a space that supports community well-being.

Students will:

- communicate design ideas, challenges and outcomes to different audiences, adapting their language and explanations as needed
- communicate project-related challenges, performance analysis and refinements to their work
- communicate design ideas for various purposes and audiences using appropriate industry-standard formats

Overall Expectations

A1. Initiating and Planning
A2. Designing and Performing
A3. Analyzing and Refining
B1. Fundamentals of Technological Development

Lesson Plan

Lesson 1: Introduction and Research (1 class period)

- Students will explore the benefits of gardening for physical and mental health.
- Students will investigate sustainable garden practices.
- Students will discuss the role of community gardens in supporting seniors and communities.

Lesson 2: Planning and Garden Design (2 class periods)

- Students will collaborate with peers, seniors or both to design a garden layout.
- Students will research and select appropriate native plants.
- Students will create sketches and planting plans.
- Students will identify sustainable practices.

Lesson 3: Planting and Implementation (3 class periods)

- Students will prepare soil and planting areas.
- Students will plant seeds, seedlings or both using proper techniques.
- Students will apply knowledge of plant care and environmental conditions.
- Students will collaborate with community members during the process of planting.

Lesson 4: Maintenance, Harvest and Reflection (1-2 class periods)

- Students will maintain the garden through watering, weeding and monitoring growth.
- Students will participate in harvesting produce.
- Students will engage in a community celebration or sharing event.
- Students will reflect on their learning, challenges and impacts on the community.

Cluster 3: What Worked, What Didn't, What's Next

Students will reflect on project results to evaluate successes, challenges and improvements. They will identify next steps for future designs or applications.

Resource:
Tensegrity Structure - Tech Design Challenge

Lesson Overview

Students will design, prototype and manufacture a custom tensegrity structure using the engineering design process. They will explore structural forces, material properties and manufacturing techniques while developing a functional and aesthetically refined structure using CAD software and fabrication tools (laser cutter or 3D printer).

Students will:

- identify challenges they encountered in the engineering design process
- apply critical thinking skills to explain how they addressed challenges to minimize recurrence

- collect data and feedback on their process and product, and propose refinements for a future iteration of their work
- evaluate the transferable skills they developed during a project and connect their outcomes to future careers

Overall Expectations

A3. Analyzing and Refining

B3. Careers and Pathways in Technology and the Skilled Trades

Lesson Plan

Lesson 1: Problem Definition and Research (1-2 class periods)

- Students will analyze the design challenge.
- Students will investigate how tensegrity structures function.
- Students will identify criteria and constraints.
- Students will explore existing designs through reverse engineering.

Lesson 2: Concept Development (2-3 class periods)

- Students will generate multiple design concepts.
- Students will analyze concepts using pros and cons as well as the design criteria.
- Students will select the most appropriate design for development.
- Students will consider joints, structural integrity and aesthetic features.

Lesson 3: Prototype Planning and Development (3-4 class periods)

- Students will build a low-cost prototype using popsicle sticks and string.
- Students will plan materials, tools and processes for final production.
- Students will identify safety considerations for all tools and materials.
- Students will develop CAD models aligned to manufacturing requirements.

Lesson 4: Final Build, Testing and Refinement (2-3 class periods)

- Students will manufacture final components using a 3D printer or laser cutter.
- Students will assemble the tensegrity structure ensuring proper tension balance.
- Students will test the functionality.
- Students will collect feedback and refine design as needed.