TECHNOLOGY AND THE SKILLED TRADES, GRADE 9, TAS1O COURSE 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 course plan for Technology and the Skilled Trades (TAS1O), designed to support educators in their delivery of this program.

Course Plan Introduction

A course plan outlines and organizes curriculum expectations. It is a living document that is revised as educators become increasingly aware of the abilities, strengths, needs and interests of their students. Implementation may vary by institution; the curriculum can be delivered through a single Broad-Based Technology (BBT) course, a multi-course integration or a rotational model.

A thoughtfully developed course plan:

- ensures that instruction is sequenced in a manner that aligns with the development of the skills connected to the Engineering Design Process (EDP) within the Technology Curriculum
- allocates the appropriate time for the development of the fundamental concepts connected to the process of learning through the EDP so that students have multiple opportunities to focus on the overall expectations in the course
- aligns curricular processes, fundamental concepts and skills with project-based learning, demonstrating their application across subject areas and real-world contexts
- ensures that all overall expectations are addressed at least once within the course

Note:

This course plan represents one possible approach to sequencing instruction in TAS1O. Educators are encouraged to adapt and refine this plan to reflect local contexts, available resources and the learning needs of their students, while maintaining alignment with the overall expectations of the course. Cluster completion times outlined in this course plan are estimates.

Vision and Goals

The vision of the technological education program in Grades 9 and 10 is for all students to acquire and develop the skills and knowledge related to technological education that will support them in contributing to the global economic, scientific, and societal innovations of tomorrow. This learning will enhance their ability to achieve success in secondary school, the workplace, postsecondary education or training, and daily life. A central component of this curriculum is safe, practical, hands-on, experiential learning that will support students in becoming technologically literate citizens. That is, they are able to understand, work with, and benefit from a range of technologies — skills that are necessary given the power, reach, and rapid evolution of technology. To succeed in today's rapidly changing and technologically dependent society, students need to be effective problem solvers and critical thinkers, able to understand, question, anticipate, and respond to the implications of technological innovation. Students who pursue careers in technology will also need these high-level skills to develop solutions to technological challenges or to provide the services required in their chosen fields.

The goals of the technological education curriculum for Grades 9 and 10 are to enable students to:

- gain an understanding of the fundamental technological concepts underlying technological education through hands-on, project-based learning while developing technical skills;
- develop creative and flexible approaches to problem solving that will help them address challenges in various areas in everyday life;
- develop a level of technological proficiency that will allow them to be critical consumers and producers of technological solutions;
- explore the impact and development of technology, including emerging technological innovations;
- see themselves as capable and successful STEM (science, technology, engineering, and mathematics) learners and practitioners;
- explore career opportunities in technological fields and the skilled trades, and make connections that will help them take advantage of job skills programs and potential postsecondary pathways, including apprenticeship.

(Ontario Ministry of Education. (2024). Technological Education, Grades 9-10 (TAS1O). https://www.dcp.edu.gov.on.ca/en/curriculum/technological-education/courses/tas2o/g9-10-intro)

Reflective Questions for Consideration

Consider the following questions when developing, implementing and reflecting on course plans.

How can my plans:

- incorporate, honour, and value student voice, choice and lived experiences to support engagement and understanding?
- effectively use diverse resources, examples and pedagogical approaches?
- incorporate tasks that reflect high expectations for all students while remaining accessible and respectful?
- support the multiple ways information should be collected and assessed (for example, conversation, observations, products)?
- support students' exploration of pathways and connections associated with various technology related careers?
- provide hands-on learning experiences, enable students to deepen their understanding of the skilled trades and improve their fundamental technological skills?
- support academic success by providing students with a range of opportunities to demonstrate their understanding of technological education concepts while applying science, math and the engineering design process?

Cycle 1: Technology, Society and Sustainability

Approximate time for completion: 25 hours

In this cycle, students will pull back the curtain on the technology that surrounds us—from the gadgets in our pockets to the industrial tools in our shops. By investigating the life cycle of items like cellphones, stand mixers or cordless drills, students will uncover the environmental and social costs of modern manufacturing. To share these hidden impacts, students will choose their medium: designing a digital infographic, mapping a physical storyboard or building an art installation from upcycled tech materials.

The journey continues with the “Mobile Service Challenge,” where students will use the engineering design process to build a service on wheels. Students can design anything from cuisine hubs to mobile repair clinics, ensuring their service is accessible, ethical and reflects their own community’s needs.

Students will then connect with a job from their “tech classroom” that has a connection to environmental waste, climate change or recycling within the area of a BBT. Students will share their findings in a career fair style presentation. This will increase students' thoughtfulness around consuming and purchasing products that can be neither reused nor recycled.

Cluster 1: The Secret Life of Tech

Approximate time for completion: 10 hours

Technology is everywhere but what's actually inside the gadgets we use? In this activity, students will investigate the life cycle of a common tool—whether it's a cellphone, a kitchen stand mixer or a cordless drill. They'll follow the journey from mining the rare earth minerals needed for production to the mountains of e-waste left behind when these items are discarded.

Topics and Expectations

- Design Processes and Related Skills: A1.1, A1.2, A1.4, A2.1, A2.6
- Technological Development, Impacts, and Careers: B1.1, B1.2, B2.1, B2.2

Skills and Connections	Specific Expectations
Students will research the raw materials used in a chosen tool (for example, lithium in drills, stainless steel in mixers, cobalt in phones) to identify environmental/social impacts.	B1.2, B2.2
Students will investigate and evaluate their local school and community e-waste disposal and recycling programs to analyze how local actions impact the global e-waste crisis.	B1.1, B2.1
Students will present their findings and impacts of technology on the environment and society.	A1.4, A2.1, A2.6
Students will identify and explain at least one strategy to extend the lifespan of a technological device.	A1.1, A1.2

Cluster 2: The Mobile Service Challenge

Approximate time for completion: 10 Hours

In this cluster, students will explore the environmental, social and ethical impacts of mobile technology and services through the lens of sustainability. Using the "Food Truck" as a familiar and engaging entry point, students will analyze the life cycle of mobile service units, identify efficient and accessible design features, and examine how skilled trades are evolving to address climate change and community needs. Throughout the cycle, students will apply the engineering design process, communicate ideas through technical documentation and digital media and connect their hands-on learning to real-world career pathways.

Topics and Expectations

- Design Processes and Related Skills: A1.3, A2.2, A2.3, A2.4, A2.6, A3.1
- Technological Development, Impacts, and Careers: B1.1, B1.4, B2.2

Skills and Connections	Specific Expectations
Students will design branding for a mobile service, such as an e-waste collection hub, mobile tech repair lab or a pop-up tool library.	B1.1, B1.4
Students will use a variety of digital or physical tools to design a scaled floor plan for a mobile service unit or pop-up shop.	A1.3, A2.2, A2.6
Students will develop a plan for startup costs (vehicle/ trailer purchase, tools required and business licences) and operational expenses.	A2.2, A2.6
Students will justify their choice of power sources (for example, solar arrays, battery banks) and interior materials, prioritizing sustainability for their mobile operation.	A2.3, B2.2
Students will participate in a "Service Simulation" where peers act as clients with specific needs.	A2.4, A3.1

Cluster 3: The Green Career Expo

Approximate time for completion: 5 hours

This culminating cluster will shift students into thinking about professional roles as they investigate how skilled trades are evolving to solve global environmental challenges. Students will research a specific sustainable trade or technology pathway and present their findings in a simulated career expo.

Topics and Expectations

- Design Processes and Related Skills: A1.3, A1.4, A1.5, A2.1, A2.6
- Technological Development, Impacts, and Careers: B1.1, B1.3, B1.4, B2.1, B3.1, B3.3

Skills and Connections	Specific Expectations
Students will research a sustainable trade or technology-related career, including training pathways (apprenticeship, college or university, workplace), required skills and earning potential.	A1.3, A1.5, B1.4, B3.1
Students will analyze how the chosen career contributes to environmental sustainability, climate change mitigation or resource conservation.	B1.1, B1.3
Students will create a visual aid using correct technical terminology and effective visual communication.	A1.4, A2.1, A2.6
Students will participate in a role-play career expo, explaining their career choice, answering questions and informing their peers of its relevance and importance.	B2.1, B3.3

Cycle 2: Critical Thinking, Problem Solving and Researching

Approximate time for completion: 35 hours

Designers and technologists use creative and critical thinking to understand problems and develop effective solutions. Research, experimentation and iteration play a key role in shaping how products, structures and systems are designed, informed by a wide range of perspectives and experiences. Design challenges will provide students with opportunities to explore how ideas evolve through testing and refinement, while considering factors such as user needs, materials, sustainability and real-world constraints. As a result, students will demonstrate their learning by creating, testing and improving solutions that reflect purposeful decision making, thoughtful use of resources and an understanding of real-world constraints.

Cluster 1: School Improvement and Critical Thinking

Approximate time for completion: 10 hours

In this cluster, students will examine everyday challenges within the school environment and explore how the engineering design process can be used to improve spaces, systems or experiences. Students will investigate consumer needs, constraints and existing solutions to develop well-reasoned design proposals for change.

Topics and Expectations

- Design Processes and Related Skills: A1.1, A1.3, A1.4, A2.1, A2.2, A2.3, A2.4, A2.5
- Technological Development, Impacts, and Careers: B1.1, B1.3, B2.3

Skills and Connections	Specific Expectations
Students will use the engineering design process to investigate challenges within the school environment and explore ways to improve spaces, systems or experiences.	A1.1, B1.1, B2.3
Students will connect with members of the school community who apply critical thinking and problem solving.	A2.2, A2.3, A2.4, A2.5, B1.1
Students will research existing solutions from a variety of communities that could help inform improvements.	A1.1, A2.5, B1.3
Students will investigate a specific school-based challenge, ideate and evaluate solution ideas and use sketches, diagrams or a prototype/model to represent and revise their solution throughout the design process.	A1.3, A1.4, A2.1, A2.3, B1.1, B2.3

Cluster 2: Sustainable and Responsible Problem Solving

Approximate time for completion: 15 hours

Students will study issues related to environmental impacts in their community. Students will investigate how systems and processes can be redesigned to reduce waste and improve sustainability.

Topics and Expectations

- Design Processes and Related Skills: A1.1, A1.3, A1.4, A2.1, A2.2, A2.3, A2.4, A2.5
- Technological Development, Impacts, and Careers: B1.1, B1.3, B2.3

Skills and Connections	Specific Expectations
Students will investigate issues related to everyday activities and explore ways to reduce waste and improve sustainability.	A1.1, B1.1, B2.3
Students will analyze how systems, processes and products can be redesigned to achieve more sustainable outcomes using the engineering design process.	A2.2, A2.3, A2.4, A2.5, B1.1
Students will research existing practices, policies or strategies that promote sustainability and consider their usefulness in new contexts.	A1.1, A2.5, B1.3
Students will evaluate the effectiveness of their proposed solutions and justify design decisions based on impacts to the environment, society and the economy.	A1.3, A1.4, A2.1, A2.3, B1.1, B2.3

Cluster 3: Everyday Product Redesign

Approximate time for completion: 10 hours

In this cluster, students will apply the engineering design process to analyze and redesign an existing everyday product. Students will research user needs, materials, fundamental concepts and environmental impacts to develop and refine a product-based solution.

Topics and Expectations

- Design Processes and Related Skills: A1.1, A1.3, A1.4, A2.1, A2.2, A2.3, A2.4, A2.5
- Technological Development, Impacts, and Careers: B1.1, B1.3, B2.3

Skills and Connections	Specific Expectations
Students will evaluate everyday products to identify problems they are designed to solve, considering user needs, function and environmental impact.	A1.1, B1.1, B2.3
Students will conduct research on materials, manufacturing processes and existing product designs to consider improvements on design and environmental impact.	A2.2, A2.3, A2.4, A2.5, B1.1
Students will apply the engineering design process to develop improved product solutions.	A1.1, A2.5, B1.3
Students will create prototypes of their redesigned product and reflect on the fundamental concepts, their effectiveness, usability and environmental impact.	A1.3, A1.4, A2.1, A2.3, B1.1, B2.3

Cycle 3: Technical Skills, Tools and Fabrication

Approximate time for completion: 35 hours

The objects in our modern world are designed and fabricated using countless materials and processes. Understanding material properties and how to manipulate them using different tools and techniques is essential. During this cycle, students will work through a series of activities that build on previous learning to develop and hone their technical skills.

Cluster 1: Machine Safety

Approximate time for completion: 15 hours

Students will develop an understanding of safe work practices and demonstrate their ability to safely use the tools and equipment in the teaching space.

Topics and Expectations

- Design Processes and Related Skills: A2.2, A2.4, A2.7, A4.1, A4.2, A4.3, A4.4, A4.5, A4.6
- Technological Development, Impacts, and Careers: B1.2, B2.2, B3.1, B3.2, B3.3

Skills and Connections	Specific Expectations
Students will explore various processes and gain an understanding of how to protect themselves in the workplace.	A4.1, A4.2, A4.3, A4.5, A4.6
Students will work with different materials and tools/equipment that are used in industry.	A2.4, A2.7, A4.3, A4.4, A4.5, A4.6, B2.2
Students will identify different careers and personal protective equipment in different technological fields.	A2.2, A4.1, B1.2, B3.1, B3.2, B3.3
Students will demonstrate knowledge of their learning environment, which includes identifying equipment and egress routes, listing emergency procedures and general classroom routines.	A4.1, A4.2

Cluster 2: Competency in a Skill

Approximate time for completion: 10 hours

Students will begin to develop a health and safety mindset through the demonstration of fundamental concepts and the use of a variety of equipment, materials and techniques. Please note that comprehensive competency skills are not listed since each broad-based technology subject area has specific health and safety requirements.

Topics and Expectations

- Design Processes and Related Skills: A1.1, A1.2, A1.5, A1.6, A1.7, A2.2, A2.7, A3.2, A3.3, A4.2, A4.4, A4.5, A4.6
- Technological Development, Impacts, and Careers: B1.1, B1.2, B2.3, B3.4

Skills and Connections	Specific Expectations
Students will practise techniques to develop competency in a variety of equipment/tools.	A1.1, A1.2, A2.2, A2.7, A3.2, A4.2, A4.4, A4.5, A4.6
Students will design a prototype and/or service, demonstrating an appropriate selection of materials, equipment and techniques.	A1.5, A1.7, A3.3, B1.1, B3.4
Students will investigate and apply a variety of project management strategies to address barriers to successful completion of a project.	A1.1, A1.5, A1.6, A2.2, A3.2, B1.1, B1.2, B2.3

Cluster 3: Consolidation

Approximate time for completion: 10 hours

Students will demonstrate their understanding of technical skills through a self-directed project.

Topics and Expectations

- Design Processes and Related Skills: A1.2, A1.3, A1.4, A1.5, A1.6, A1.7, A2.1, A2.2, A2.3, A2.7, A3.1, A3.2, A3.3, A3.4
- Technological Development, Impacts, and Careers: B1.3, B3.1, B3.2, B3.3, B3.4

Skills and Connections	Specific Expectations
Students will identify project criteria and demonstrate their understanding of safety protocols and procedures.	A1.2, A1.3, A1.4, A1.5, A1.6, A2.1, A2.2, A2.3
Students will demonstrate measurement skills by ensuring their project conforms to their proposed prototype plans.	A2.2, A2.7, A3.1, A3.2
Students will critically analyze their project and reflect on possible alternatives and/or improvements.	A1.3, A3.3, A3.4, B1.2, B1.3, B3.1, B3.2, B3.3
Students will identify technical and transferable skills they have demonstrated and investigate career paths that are aligned with these skills.	A1.2, A1.4, A1.7, A2.3, A3.1, A3.2, A3.3, A3.4, B3.4

Cycle 4: Final Design Project and Communication

Approximate time for completion: 15 hours

The final cycle of this course focuses on the transition from conceptual design to professional delivery. Students will have spent the semester learning the "how-to" of specific skills and processes in class: preparing final products, presenting their ideas, organizing their time effectively and using the engineering design process.

This cycle challenges them to apply those skills to solve a complex problem and communicate their solution.

Cluster 1: Design Pitch and Failure Log

Approximate time for completion: 5 hours

Students will develop a prototype, identifying the user problem, material constraints and target audience.

Topics and Expectations

- Design Processes and Related Skills: A1.3, A2.1, A3.1, A3.2, A3.4, A4.3, A4.5, A4.6
- Technological Development, Impacts, and Careers: B1.1, B1.2, B2.1, B2.2 , B3.1, B3.4

Skills and Connections	Specific Expectations
Students will identify a problem for a specific user and conduct research to develop a solution to address their needs using the engineering design process.	A1.3, B1.2
Students will validate their material choices by testing prototypes against user problem requirements and the impact of the design's functional integrity.	A2.1, A3.1, A3.2, B1.1
Students will communicate their results, insights and key learnings into a pitch.	A3.4, B1.1, B1.2, B2.1, B2.2, B3.1, B3.4

Cluster 2: Polished Prototyping

Approximate time for completion: 5 hours

Students will define their design and prepare it for production. They must demonstrate an understanding of materials, techniques and project management skills.

Topics and Expectations

- Design Processes and Related Skills: A1.2, A1.5, A2.1, A2.2, A3.1, A3.2, A4.1, A4.2, A4.3, A4.4, A4.5, A4.6
- Technological Development, Impacts, and Careers: B1.3

Skills and Connections	Specific Expectations
Students will convert their designs into a working prototype.	A1.2, A1.5, A2.1, A2.2, B1.3
Students will evaluate the effectiveness of their prototype using qualitative and quantitative methods.	A3.1, A3.2
Students will demonstrate a safety mindset and apply necessary project management skills to ensure a safe work environment.	A2.1, A4.1, A4.2, A4.3, A4.4, A4.5, A4.6

Cluster 3: The Trade Show Showcase

Approximate time for completion: 5 hours

Students will create a professional display to showcase their designs and explain their design process.

Topics and Expectations

- Design Processes and Related Skills: A1.4, A2.1, A2.6
- Technological Development, Impacts, and Careers: B1.1, B1.2, B2.1, B2.2, B3.4

Skills and Connections	Specific Expectations
Students will demonstrate communication and documentation strategies in a short pitch situation.	A1.4, A2.1, B3.4
Students will develop a brief technical document of their project that includes all necessary information.	A2.6, B1.1, B1.2, B2.1, B2.2
Students will analyze the life cycle of materials and the accessibility of their design for diverse users.	B1.2, B2.2

Appendix I: Vertical Scan

Cycle 1: Technology, Society and Sustainability

1. The Secret Life of Tech
2. The Mobile Service Challenge
3. The Green Career Expo

Cycle 2: Critical Thinking, Problem Solving and Researching

1. School Improvement and Critical Thinking
2. Sustainable and Responsible Problem Solving
3. Everyday Product Redesign

Cycle 3: Technical Skills, Tools and Fabrication

1. Machine Safety
2. Competency in a Skill
3. Consolidation

Cycle 4: Final Design Project and Communication

1. Design Pitch and Failure Log
2. Polished Prototyping
3. The Trade Show Showcase

Appendix II: Examples of Applying Cycles to Specific BBTs

Cycle 1: Technology, Society and Sustainability

	Cluster 1: The Secret Life of Tech	Cluster 2: The Mobile Service Challenge	Cluster 3: The Green Career Expo
TGJ Communications Technology	Students will research the precious metals required to produce the cameras and screens used in media production (mobile devices or DSLR/SLR cameras).	Students will design a branding package and interior floor plan for a solar-powered podcast or film studio on wheels, ensuring the layout is AODA-compliant.	Students will research careers like UX designers for environmental apps or sustainable print specialists, focusing on how digital efficiency reduces physical waste.
TEJ Computer Technology	Students will map the supply chain involved to produce a smart device, identifying the logistical and environmental impacts.	Students will investigate the use of IoT (internet of things) devices in the use of mobile delivery fleets such as food couriers and delivery services.	Students will examine the differences and energy savings of smart home devices such as thermostats and automatic lights.
Construction Technology	Students will research a common construction material and explain where it comes from, how it is made and how it impacts the environment.	Students will redesign a small structure, such as a shed or tiny home using more energy-efficient or sustainable materials. They will explain why their choices are better for the environment.	Students will compare low-cost and sustainable materials and reflect on how cost and demand affect construction decisions.
THJ Green Industries	Students will design the life cycle of a common gardening tool (for example, a cordless hedge trimmer), tracing the lithium-ion battery from mining to hazardous waste disposal and proposing a maintenance plan to extend the tool's life.	Students will design a mobile urban garden hub or tool library that fits into a trailer, creating a scaled floor plan for efficient storage of plants/tools and selecting sustainable solar power sources for irrigation pumps.	Students will explore careers such as urban forester or sustainable landscape designer, presenting a hero profile that highlights how these professionals mitigate urban heat islands and support local biodiversity.
TXJ Hairstyling and Aesthetics	Students will investigate the life cycle of a blow dryer and the environmental impact of synthetic dyes, mapping how chemicals move from the salon sink to the local water table.	Students will design a mobile grooming unit that uses high-efficiency water nozzles and non-toxic products, creating a layout that maximizes ergonomic flow in a compact space.	Students will explore the role of a sustainability co-ordinator in the beauty industry, focusing on how salon waste (for example, hair and foils) is repurposed into oil-slick booms.

TPJ Health Care Technology	Students will research the use of surgical masks and the materials they are made from, where to dispose of them and why they do not biodegrade.	Students will analyze the life cycle of a mobile medical unit (from manufacturing to disposal) and list items for transport.	Film and edit a "Day in the Life" interview with a local green professional, using professional shots to show their tech tools in action.
TFJ Hospitality and Tourism	Students will trace the life cycle of a common kitchen appliance in the home/classroom (for example, a stand mixer or blender), researching the extraction of metals and the environmental impact of non-recyclable parts like plastic casings and heating elements.	Students will design a mobile sustainable pop-up cafe brand, focusing on a layout that minimizes energy use and manages waste (composting and recyclable packaging) while adhering to AODA standards for customer service and ergonomics.	Students will research a career in sustainable tourism or farm-to-table chef, investigating their education pathways and how they reduce the carbon footprint of the food supply chain.
TMJ Manu-facturing Technology	Students will take apart a common hand tool to identify different alloys (steel, aluminum, carbide), researching the energy required to forge them versus the benefits of using recycled scrap.	Students will design a mobile welding or 3D printing repair shop, creating a CAD layout that focuses on safe tool storage, spark suppression and auxiliary power management.	Students will research careers in remanufacturing or robotics, presenting how precision machining can extend the life of multimillion-dollar industrial machines.
TDJ Technolog-ical Design	Students will choose any item and examine the design choices made when selecting the materials for the product.	Students will design a CAD layout of their service vehicle using real-world measurements.	Students will research different design-based jobs and research how commonly used materials are recycled.
TTJ Trans-portation Technology	Students will trace the lithium and cobalt in an EV battery or cordless impact wrench and compare the impact of electric motors versus internal combustion engines.	Students will design a mobile service unit for electric bikes or scooters, calculating the weight distribution of heavy battery storage and designing a safe high-voltage workspace.	Students will research the shifts in vehicle diagnostics, exploring the education needed to work on hydrogen fuel cells and high-voltage vehicle systems.

Cycle 2: Critical Thinking, Problem Solving and Researching

	Cluster 1: School Improvement and Critical Thinking	Cluster 2: Sustainable and Responsible Problem Solving	Cluster 3: Everyday Product Redesign
TGJ Communications Technology	Students will investigate broken communication systems, such as confusing hallway signage or outdated cafeteria menus. They will connect with the school community to identify pain points and research modern graphic design principles such as visual hierarchy, typography and high-contrast accessibility. Then, they will use their findings to propose a modernized, user-friendly signage system or digital directory.	Students will study the environmental impact of physical media waste (for example, printed flyers, newsletters, and posters) within the school. They will investigate existing digital alternatives and propose a more sustainable system, such as a QR code-based event platform or an optimized digital bulletin board that reduces the school's carbon footprint while maintaining high engagement.	Students will apply the Engineering Design Process to analyze and redesign the user interface of a school-related digital tool, such as the student portal or a common mobile app. They will focus on improving the user experience (UX) by researching inclusive design standards, conducting usability testing and creating a digital prototype that addresses inefficiencies and diverse user needs.
TEJ Computer Technology	Students will use open-source software to create a Wi-Fi heatmap of common shared spaces in their school or home, identify dead zones and propose optimal wireless access point placement.	Students will investigate methods to reuse and repurpose e-waste in their school (for example, repurposing old computer fans and extending device lifespans through alternative uses).	Students will redesign a standard video game controller, mouse/keyboard or other input device to be accessible for a user with mobility needs.
TCJ Construction Technology	Students will design a construction project that is safe, functional and user-friendly.	Students will build a useful product using recycled or scrap materials to minimize waste.	Students will analyze a basic product and redesign it to improve its strength or usability.
THJ Green Industries	Students will use the engineering design process to investigate underutilized outdoor spaces on school grounds (for example, a neglected courtyard or a pathway to portables) and propose a plan for a quiet study garden or an outdoor learning lab.	Students will perform an energy or resource audit on the school's greenhouse, indoor lighting, irrigation systems or outdoor watering system. Using the engineering design process, students will design and prototype a gravity-fed drip irrigation system or passive wicking bed using repurposed materials to ensure consistent hydration while reducing water runoff.	Students will reverse engineer a standard seedling tray or vertical planter. They will identify material inefficiencies and redesign a prototype using biodegradable materials or a modular, space-saving layout for urban environments such as condominiums or apartments.

TXJ Hairstyling and Aesthetics	Students will identify a problem or challenge in the hairstyling classroom (for example, tool storage, sanitation routines, client comfort, time management or safety). They will analyze the issue and suggest a practical improvement.	Students will examine a hairstyling product, tool or practice, evaluate its sustainability, safety and responsibility and use critical thinking to suggest a redesign.	Students will choose an everyday hairstyling tool and redesign it to improve comfort, safety, efficiency or sustainability.
TPJ Health Care Technology	Students will investigate an everyday health-related challenge within the school environment. Then, they will apply the engineering design process to develop a well-reasoned proposal that improves a space, system or experience to better support student health and well-being.	Students will study healthcare–related environmental impacts in their community and investigate how medical systems and processes can be redesigned to reduce waste and improve sustainability.	Students will demonstrate their understanding of healthcare practices and technical skills by completing a self-directed project focused on improving patient care, safety or sustainability.
TFJ Hospitality and Tourism	Students will investigate a workflow bottleneck in the school cafeteria or hospitality lab (for example, the student lunch line) and propose a redesigned floor plan or service system to improve speed and user experience.	Students will conduct a waste audit of the school's food service areas, analyzing the volume of single-use plastics or organic waste and redesigning a composting or reusable container system.	Students will analyze a standard takeout container or a kitchen hand tool (for example, vegetable peeler) and redesign it to be more ergonomic for users with limited dexterity or more sustainable for the environment.
TMJ Manu-facturing Technology	Students will design and build a wall-mounted metal hook system for: • hanging safety goggles in tech rooms • hanging sports equipment • organizing and keeping clutter off floors	Students will design and fabricate a desk organizer only using scrap metal, off-cuts, damaged pieces or recycled materials found in the classroom. They will research sustainable manufacturing, analyze which scrap materials are safe, design a functional product with minimal waste and reflect on their choices to reduce environmental impact.	Students will select a simple, everyday object to use at school or at home and redesign it to make it more durable, efficient, eco-friendly, safe or easy to use. This can include a desk lamp bracket, locker shelf, headphone hanger or keychain, based on student choice.
TDJ Technolog-ical Design	Students will create a scaled drawing of the space and plan their design based on the available space.	Students will gather materials that would normally be thrown away and use them to solve a design challenge.	Students will take apart and analyze an existing product. Then, they will design and build a new solution to improve the product.

TTJ Trans-portation Technology	Students will identify a transportation-related safety issue around the school, such as unsafe bike parking, bus loop congestion, poor visibility for pedestrians or student parking. They will design and fabricate an improved solution using transportation-related skills.	Students will analyze, design and fabricate a safe, responsible way to store, organize or repurpose used tires. They can create a tire rack, storage cart, wall mount, recycling bin, or upcycle something made from tires.	Students will redesign a simple, everyday automotive part using safer materials, improved ergonomics and responsible manufacturing techniques.

Cycle 3: Technical Skills, Tools and Fabrication

	Cluster 1: Machine Safety	**Cluster 2: Competency in a Skill**	**Cluster 3: Consolidation**
TGJ Commu-nications Technology	Students will create a document listing every light in their studio. They will apply electrical formulas to ensure they are under the circuit limit and map the safe path of taped-down cables and equipment placement.	Students will submit a portfolio of technical proofs, such as a lighting diagram, a before-and-after audio edit and a vector logo exported in multiple professional formats (.svg, .png).	Students will present a polished media project alongside a technical log that documents their measurements, file management and transferable industry skills.
TEJ Computer Technology	Students will demonstrate proper electrostatic discharge safety (ESD) using wrist straps and anti-static mats before handling exposed circuit boards.	Students will assemble a basic computer system and identify the components used (for example, CPU, RAM, storage).	Students will develop a plan to assemble a "dream computer" based on currently available parts using a web tool such as PCPartPicker.
TCJ Construc-tion Technology	Students will demonstrate safe use of hand and power tools while following shop safety procedures.	Students will practise accurate measuring, cutting and fastening to complete a small project.	Students will apply learned skills to complete a small construction project from start to finish.
THJ Green Industries	Students will be introduced to essential landscaping and forestry tools (cordless drills, oscillating saws or manual loppers). They will perform a safety inspection on a battery-powered mower or trimmer, identifying points of failure and proper PPE.	Students will learn to use technical measurement tools like a transit level, clinometer or a simple tape measure to map out a 1:1 scale garden bed. Students will calculate soil volume and plant spacing math to ensure zero-waste material ordering.	Students will use the tools from Cluster 1 and the measurements from Cluster 2 to fabricate a wooden (or other material) vertical herb planter. Students will practise joinery (drilling pilot holes, countersinking) and apply a non-toxic finish to protect the wood for outdoor use.

TXJ Hairstyling and Aesthetics	Students will research and explain the safe use of a common hairstyling electrical tool by creating a safety poster.	Students will demonstrate competency in one foundational hairstyling skill (braiding, blow-drying, shampooing, using hot tools) through practice, documentation and reflection.	Students will consolidate their learning by creating a mini portfolio that shows what they have learned about safety, skills and responsible practices in hairstyling and esthetics.
TPJ Health Care Technology	Students will develop an understanding of safe healthcare practices and demonstrate their ability to safely use medical tools, equipment and technology within a clinical or simulated healthcare setting.	Students will develop a health and safety mindset by demonstrating fundamental healthcare skills, including using medical equipment, materials and techniques in a safe and controlled environment.	Students will demonstrate their understanding of healthcare industry practices and technical skills by completing a self-directed project focused on improving patient care, clinical processes or healthcare technology.
TFJ Hospitality and Tourism	Students will be introduced to commercial kitchen equipment such as industrial mixers, convection ovens and induction burners. They will demonstrate the safe start and lockout procedures for a commercial meat slicer, food processor or available machine in space.	Students will practise standardized cutting techniques such as julienne and brunoise within millimetre accuracy. They will use digital scales to convert recipes from imperial to metric, ensuring a perfect yield for a standardized batch of soup or a similar dish.	Using the skills from clusters 1 and 2, students will fabricate a high-quality, nutritious grab-and-go meal. They must use professional plating tools (piping bags, ring molds) to ensure the final product meets commercial esthetic standards.
TMJ Manu-facturing Technology	Students will design and fabricate a steel bracket assembly that includes a welded joint, drilled or machined holes, a CNC cut plate component, a documented fabrication process plan or a safety checklist for all machines used in the classroom.	Students will complete a competency-based manufacturing task that could include measuring and laying out steel coupons, cutting materials safely, machining/drilling an accurate hole or tacking and welding two coupons. They will evaluate their weld quality and reflect on their skill development in a journal or portfolio.	Students will complete a written or video reflection addressing the following questions: • What technical skills did you improve? • Which tools or machines did you gain the most confidence with? • What challenges did you face during fabrication and how did you overcome them? • How does this task connect to real skilled trades careers? • What would you do to improve accuracy or safety?

TDJ Technological Design	Students will safely demonstrate how to use prototyping tools, such as scissors, glue guns, laser cutters and 3D printers.	Students will design a part and create it physically, ensuring the part is dimensionally accurate.	Students will create a project (such as a phone stand) using two to three of the learned prototyping tools.
TTJ Transportation Technology	Students will develop core transportation skilled competencies by inspecting, measuring and servicing a small vehicle component in a safe and controlled environment. Examples may include a tire assembly, brake rotor, spark plug, drive belt, bicycle hub or small engine part.	Students will safely construct, troubleshoot and test a basic 12-volt lighting circuit like those used in transportation systems such as cars, bikes, ATVs and trailers.	Students will evaluate their circuit against simplified industry standards and ask themselves: • Why does this matter for safety and reliability? • What safety habits were most important? • What mistakes or problems did I encounter? • What would I do differently? • What electrical components or tools did I learn to use?

Cycle 4: Final Design Project and Communication

	Cluster 1: Design Pitch and Failure Log	**Cluster 2: Polished Prototyping**	**Cluster 3: The Trade Show Showcase**
TGJ Communications Technology	Students will identify a user problem and create a visual design brief outlining constraints and target audiences. Students will maintain a photo-documented "failure log" to track software errors and discarded drafts and analyze technical flaws before production.	Students will convert designs into working prototypes while passing a pre-flight audit to justify machine settings and CAM logic. Students will perform a tolerance test using precision tools to measure their prototype's accuracy against original dimensions.	Students will create a professional booth featuring a technical document and a QR code linking to their digital portfolio. Students will pitch their design to stakeholders, demonstrating readiness for professional client-contractor relationships.
TEJ Computer Technology	Students will build an interactive portfolio using a web development tool (for example, Google sites) to document and reflect on their troubleshooting and problem solving throughout a project.	Students will conduct benchmark testing on a constructed PC or network, using digital tools to measure if the system's actual performance meets pre-established criteria.	Students will organize project assets into a standardized directory structure (for example, folders, sub-folders), adhering to common file-naming conventions and file path organization.

TCJ Construc-tion Technology	Students will plan a construction project within set size and material limits while documenting design challenges and improvements.	Students will build, test and refine a prototype before completing their final project.	Students will visually and verbally present their final project and explain their materials, tools, safety considerations and improvements.
THJ Green Industries	Students will develop a green trades profile showcasing their modular planter build, a safety certification log (WHMIS/ Tool Training) and a reflection on their preferred specialization (for example, arborist vs. horticulturist).	Students will map local neighbourhoods to identify tree equity gaps. They will propose a community planting plan designed to reduce heat islands in lower-income areas, focusing on social justice through ecology.	Students will explore the use of AI-driven drones for crop monitoring or automated farm-bots. Students will create a conceptual design for a zero-human-intervention rooftop garden that uses sensors to self-regulate water and nutrients.
TXJ Hairstyling and Aesthetics	Students will practise and improve client consultation skills by planning a hairstyling service based on a client's needs, wants, lifestyle and face shape. Students will create a consultation pitch and keep a failure log that tracks changes and learning.	Students will take a mock client consultation and apply their recommendations in a hands-on hairstyling makeover.	Students will present their consultation, makeover and reflection in a professional format to classmates, simulating a real salon discussion or trade show display. Students will also consider how hair chemistry and textures can affect the outcome of a client's desired style.
TPJ Health Care Technology	Students will create a visual design brief defining the patient or user problem, material and safety constraints and target audience. They will maintain an iteration tracker to document early prototypes, errors and revisions, highlighting the non-linear nature of designing solutions in health care.	Students will define their healthcare–focused design and prepare it for implementation, demonstrating an understanding of medical materials, techniques, safety considerations and project management skills.	Students will create a professional healthcare focused display, showcasing their designs and explaining their process, including how their solution addresses patient care, safety or clinical efficiency.
TFJ Hospitality and Tourism	Students will curate a digital culinary portfolio featuring high-quality photos of their Cycle 3 bistro box, a refined resume for a prep cook position and a personal food philosophy statement.	Students will investigate the ethics of the coffee or cocoa supply chain. Students will debate the social impact of living wage initiatives in the restaurant industry versus traditional tipping cultures.	Students will research cellular agriculture (lab-grown meat) or 3D food printing. They will design a futuristic menu item that addresses global protein shortages while maintaining fine dining esthetics.

TMJ Manu-facturing Technology	Students will use the engineering design process to design and fabricate a small manufactured product. Examples include a phone stand, desk organizer, bracket and sculpture.	Students will design a custom metal bookmark made from thin aluminum or a similar material. The sketch must include at least one shape that is transferred to the metal, and the finished piece must be smoothed and polished. Optional engraving or stamped patterns may be included.	Students must create a small, functional and visually appealing item that could be sold or promoted at a real trade show booth. Students will pitch their concept, identify who the customer is and why someone would want this item. Students will create technical drawings, a safety plan and a prototype.
TDJ Technolog-ical Design	Students will be assigned a design problem (such as housing, flooding or mobility issues) with specific constraints of materials and size. They will need to analyze these limits to make design decisions.	Students will go through a prototyping phase, create a minimum viable product, test their ideas and document their findings. They will make changes for their final design based on this testing.	Students will create an infographic about their design and explain how it solves the problem.
TTJ Trans-portation Technology	Students will identify a real transportation challenge, then design, build, test and refine a small-scale vehicle component or mobility system improvement. They will use the engineering design process to communicate their solutions and document their decisions (for example, redesigning a side mirror, a hand-friendly shift/selector knob, a bike reflector housing, a roadside warning triangle or a stroller brake lever).	Students will design and create a polished, ergonomic handle grip prototype used on a mobility or transportation-related device (for example, bicycle handlebar, scooter grip, push-rim on a wheelchair, stroller handle or lawn-equipment handle). Emphasis will be placed on human factors and ergonomics, precision measurement and shaping, materials and finishing and using the engineering design process. Students should consider these fundamental concepts.	Students will design, fabricate, refine and present a polished prototype of a transportation-related accessory suitable for display at a trade show showcase event. This could solve a problem related to vehicle safety, accessibility, human control, comfort, organization and storage inside vehicles or mobility device improvements.

Work Cited

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