



Global Innovator's Toolkit

Framed in the United Nations Sustainable Development Goals, students in Grade 11 and 12 will explore, develop and implement solutions to social, economic, or environmental global issues culminating in a public exhibition of work.

Students explore and further develop the skills of an Innovator to apply a global perspective to address one or more of the United Nations Sustainable Development Goals. Students will apply their engineering and entrepreneurial mindsets to build consensus with global stakeholders, employ critical consciousness on a variety of issues, and disruptively innovate to leverage greater equity and enact global change.

I-STEM FRAMEWORK - YEAR 3 & 4

Data Management

During this course students will become experts at collecting, organizing, analysing and evaluating data from various sources, both primary and secondary. Students will use this data in conjunction with the other strands in this course, to solve big problems.

Leading

By utilizing the processes of Human Centered Design Thinking in conjunction with Integrated Thinking, students will explore the role that group dynamics plays in global problem solving. Students will approach the SDGs with an eye to culturally responsive practices, consensus building and other leadership techniques that seek to create optimal resolutions to societal issues.

Global Innovation YEAR 3 (Grade 11)

Interdisciplinary Course (IDC4U)

This package of courses, following the expectations from IDC4U as well as MBF3C, SVN3M, BOH4M and TDJ3M will build on I-STEM students' understanding of Innovation and the relationship to the United Nations (UN) Sustainable Development Goals (SDGs). Throughout the course students will be asked to explore the SDGs and their relationship to challenges that the world is facing or will be facing. By utilizing their learning, students will innovate to create and propose solutions to global problems that they identify.

Technology, The Environment & Society

Throughout this course the relationship between society and technology (past, present and future) will be explored. Students will be responsible for creating prototypes, products and solutions that demonstrate an understanding of environmentally responsible and sustainable design practices while reflecting on the cultural diversity of the global communities in which they may work.

Scientific Investigation Skills & Career Exploration

Students will initiate and plan several investigations into the SDGs, culminating in an inquiry-based research project that includes multiple iterations on prototypes. Students will perform experiments, collect and analyse data, interpret their results and communicate their proposals to an audience of professionals.

Specializations YEAR 4 (Grade 12)

Science - Biochemistry

Credits: SCH4U (Chemistry) & SBI4U (Biology)
Prerequisites: SCH3U & SBI3U

Biochemistry is the application of Chemistry to the study of Biological processes. In this specialization students will learn aspects of life science and chemical science as they apply to solving complex problems in immunology, medical science, environmental concerns, agriculture and other related fields. The learning for this course will culminate with a capstone project that addresses the SDG of Zero Hunger, Clean Water and Sanitation, Life Below Water or other related goals.

Post-Secondary Pathway
University/College Science Programs
Medical/Life Science Programs

Technology - Introduction to Mechatronics

Credits: TEJ4M (Computer Engineering) & ICS4U (Computer Programming)
Prerequisites: TEJ3M & ICS3U

Uniting the principles of Robotics, Computer Engineering and Coding is the study of Mechatronics. Students in this specialization will build on their knowledge of Computer Engineering and Computer Science to create products that optimize pre-existing products and production methods. Students will learn about control systems, continuous feedback systems, robotics as well as electrical and software engineering principles. The capstone project will be designed to address SDG of Industry, Innovation and Infrastructure, Sustainable Cities and Communities and Decent Work and Economic Growth.

Post-Secondary Pathway
University/College Engineering
Robotics Programs
Computer Science Programs

Global Innovation - Innovation for Social Justice

Credits: CGW4U (World Issues) & MDM4U (Data Management)
Prerequisites: Gr. 11 English & Gr. 11 Mathematics

In the Innovation for Social Justice specialization students will explore the complexities, interconnections, and sociocultural contexts of a variety of pressing global issues. Using Big Data to reflect on sustainability and stewardship will be a focus as students seek out equitable solutions to current, and future global issues. Students will be challenged to analyze data sets to uncover ways that individual citizens, governments, and international organizations can work together to mitigate world issues as well as examine the biases that often lead to the misinterpretation and the miscommunication of information. They do so while framing issues around the SDGs such as Peace, Justice, and Strong Institutions and Partnerships for the Goals.

Post-Secondary Pathway
University/College Social Science/Law
University/College Humanities
University/College Business

Engineering - Sustainable Architecture

Credits: TDA4M (Architecture) & MCT4C or MHF4U (Mathematics)

Prerequisites: TDA3M & Grade 11 Mathematics

Working with both Ontario Building Code (OBC) and the SDGs. Students will explore how future buildings, homes and public spaces will be designed and planned with sustainability, accessibility and the environment in mind. Students enrolled in this specialization will learn about renewable energy, sustainable building materials and environmentally friendly construction methods. Students will explore how to design and build spaces that last while also honouring the community in which they are being built. The culminating project in this course will address ways to design for healthy, sustainable and environmentally passive built structures and communities with an eye to the SDGs of Sustainable Cities and Communities, Affordable and Clean Energy and Good Health and Well Being.

Post-Secondary Pathway
University/College Engineering
University/College Business
Apprenticeship
Trades
Architecture
Design

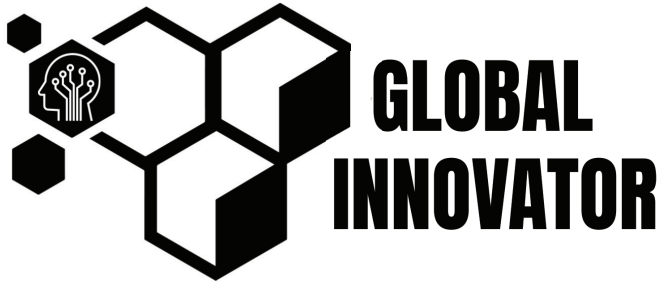
Mathematics - The Mathematics for Change

Credits: MCV4U (Calculus) & SPH4U (Physics)
Prerequisites: SPH3U & MHF4U (Co-requisite)

Students enrolled in this specialization can expect to apply their mathematical knowledge to fields such as physics, finance, industry, or engineering to solve real world complex problems. By understanding how pure mathematics has been used to develop fields such as physics, students will be armed with the tools to apply mathematical methods to other diverse fields. Students will explore Forces, Energy, Gravity, Light and even Quantum Mechanics through the lens of Calculus to address SDG like Responsible Consumption and Production, Industry Innovation and Infrastructure, and Climate Action.

Post-Secondary Pathway
University/College Science Programs
Medical/Life Science Programs

Students must select at least one specialization in their grade 12 year, but may select as many specializations as they can fit into their timetable.



Throughout the I-STEM program, students will develop and refine skills in the areas of engineering, entrepreneurship and innovation. The culmination of this work in Grade 11 and 12 will position students as change agents who contribute to solving complex problems in their desired post-secondary pathway and beyond.

In their Grade 11 and 12 years, students will develop their Global Innovators Toolkit. Building on the skills they have learned in their Engineering and Entrepreneurship years, I-STEM students will tackle problems that are global in scope involving many interconnected parts with no clearly defined solution and, ultimately, address them. Students will apply anti-colonial, anti-oppressive and anti-racist stances in their work.

In addition to the Interdisciplinary Studies Course and their specializations, students will engage in sustainable development by refining their skills in:

Communicating for Change

Consensus Building & Mediation

Critical Consciousness

Cultural & Global Competencies

Disruptive Innovation

Equitable Action & Leadership

Human Centered Design Thinking

Integrative Thinking

Metacognition

Visionary Risk Taking



In Grades 11 and 12, students will be mentored by I-STEM faculty while seeking to make their own connections in the community. Through these connections, students will solicit meaningful feedback on their projects and incorporate this throughout the school year.