



# IN-SCHOOL WORKSHOPS

SCIENCE, TECHNOLOGY, ENGINEERING &  
MATH WORKSHOPS FOR GRADES 2 TO 8



UNIVERSITY OF  
TORONTO

**Engineering**

# IN-SCHOOL WORKSHOPS

## SCIENCE, TECHNOLOGY, ENGINEERING & MATH WORKSHOPS FOR GRADES 2 TO 8

We link our workshops to Ontario curriculum expectations and are pleased to offer the following workshops to grade 2 to 8 classes. For pricing and booking instructions, please see the back cover. Each workshop can accommodate a maximum of 30 students and is offered at your school. Workshops for 2019 / 2020 are offered throughout the school year.

Our workshops are designed to be scalable and may be customized for different grades.

Please contact us regarding specific requests. Programming will be offered, on a limited basis, from October 2019 - December 2019, and January 2020 - April 2020. Full-time scheduling will resume on May 13, 2020.

### UNDERSTANDING STRUCTURES & MECHANISMS

WORKSHOP TITLE	ACTIVITY DESCRIPTION	GRADE	TOPICS	ONTARIO CURRICULUM CONNECTION	UNIVERSITY DISCIPLINE CONNECTION
<b>Hydraulic Hijinks (SM-1)</b>	Students will design and construct a hydraulic crane as a working mechanical system.	<b>Gr. 5</b>	Technological problem-solving skills to design, build and test a structure and mechanical system that performs a specific function; the advantages and disadvantages of different types of mechanical systems	Understanding Structures and Mechanisms: Forces Acting on Structures and Mechanisms	<b>Mechanical Engineering</b>
		<b>Gr. 7</b>	Safety procedures for using tools and handling materials; physical models that investigate the effects of various forces on structures	Understanding Structures and Mechanisms: Form and Function	<b>Mechanical Engineering</b>
		<b>Gr. 8</b>	Technological problem-solving skills to investigate a system that performs a function; relationship between work, force and distance; mechanical advantage	Understanding Structures and Mechanisms: Systems in Action	<b>Mechanical Engineering</b>
<b>Colossal Super-structures (SM-2)</b>	Students will design, build and test structures that can withstand applied loads.	<b>Gr. 3</b>	Technological problem-solving skills and knowledge to design and build a strong and stable structure that serves a purpose	Understanding Structures and Mechanisms: Strong and Stable Structures	<b>Civil Engineering</b>
		<b>Gr. 5</b>	Factors that impact the strength of a structure and its ability to support and resist loads; materials and construction techniques that add strength and stability to structures; vocabulary, including compression, tension, strength and stability; problem-solving skills in designing, building and testing a strong structure that serves a purpose	Understanding Structures and Mechanisms: Forces Acting on Structures and Mechanisms	<b>Civil Engineering</b>
		<b>Gr. 7</b>	Factors that determine the ability of a structure to support a load; problem-solving skills that determine the most efficient way for a structure to support a given load	Understanding Structures and Mechanisms: Form and Function	<b>Civil Engineering</b>
<b>Indy 500 (SM-3)</b>	Students will design, build and test a model racecar.	<b>Gr. 4</b>	Investigations into rotary motion in one system or its components and how energy is transferred to another system or component in the same structure	Understanding Structures and Mechanisms: Pulleys and Gears	<b>Mechanical Engineering</b>
		<b>Gr. 5</b>	Technological problem-solving skills to design, build and test a structure; external forces acting on a structure; design, build and test integrating principles of aerodynamics; evolution and change in systems	Understanding Structures and Mechanisms: Forces Acting on Structures and Mechanisms	<b>Mechanical Engineering</b>
		<b>Gr. 6</b>	Applications of the properties of air; different forces (thrust, drag, lift, weight); design, build and test integrating principles of aerodynamics	Understanding Structures and Mechanisms: Flight	<b>Mechanical Engineering</b>





## UNDERSTANDING LIFE SYSTEMS

WORKSHOP TITLE	ACTIVITY DESCRIPTION	GRADE	TOPICS	ONTARIO CURRICULUM CONNECTION	UNIVERSITY DISCIPLINE CONNECTION
<b>Creature Creation (LS-1)</b>	Students will design and construct a unique creature using principles of adaptation for survival in specific environments and ecosystems.	<b>Gr. 3</b>	Relationships in which plants and animals depend on each other (e.g., plants provide food for energy; animals help disperse pollen and seeds)	Understanding Life Systems: Understanding Basic Concepts	<b>Biology / Bioengineering</b>
		<b>Gr. 4</b>	Identification of factors (availability of water or food, amount of light, type of weather) that affect the ability of plants and animals to survive in a specific habitat	Understanding Life Systems: Habitats and Communities	<b>Biology / Bioengineering</b>
		<b>Gr. 6</b>	Characteristics of organisms; classification systems; biodiversity and its role in maintaining the resilience of species	Understanding Life Systems: Biodiversity	<b>Biology / Bioengineering</b>
<b>Gene Machine (LS-2)</b>	Students will extract DNA from plant cells through chemical processes and explore the structure and importance of cells.	<b>Gr. 5</b>	Building models to demonstrate how organs or components of body systems in organisms work and interact with other components	Understanding Life Systems: Developing Investigation and Communication Skills	<b>Biology / Bioengineering</b>
		<b>Gr. 6</b>	Distinguishing characteristics of plants and animals; role of biodiversity; cell theory; DNA; principles of heredity	Understanding Life Systems: Biodiversity	<b>Biology / Bioengineering</b>
		<b>Gr. 7</b>	Cell theory; structures and organelles in cells; characteristics, structure and function of plant and animal cells; DNA; principles of heredity	Understanding Life Systems: Cells	<b>Biology / Bioengineering</b>
<b>Food Insecurity (LS-3)</b>	Students will build a Vertical Farm to meet the requirements of different areas struggling with food insecurity.	<b>Gr. 4</b>	Identification of factors (availability of food or water, amount of light, type of weather) that affect the ability of plants and animals to survive in a specific habitat	Understanding Life Systems: Habitats and Communities	<b>Biology / Bioengineering</b>
		<b>Gr. 6</b>	Characteristics of organisms; classification systems; biodiversity and its role in maintaining the resilience of species	Understanding Life Systems: Biodiversity	<b>Biology / Bioengineering</b>
		<b>Gr. 7</b>	Demonstrate and understanding of ecosystems; interactions between an abiotic and biotic system; food chain; limits in an ecosystem	Understanding Life Systems: Interactions in the Environment	<b>Biology / Bioengineering</b>



## UNDERSTANDING MATTER & ENERGY

WORKSHOP TITLE	ACTIVITY DESCRIPTION	GRADE	TOPICS	ONTARIO CURRICULUM CONNECTION	UNIVERSITY DISCIPLINE CONNECTION
<b>Crazy Catapults (ME-1)</b>	Students will explore how force and energy affect motion by designing and building catapult mechanisms.	<b>Gr. 4</b>	Social and environmental costs and benefits of using objects in the built environment that are made from rocks and minerals	Understanding Earth and Space Systems: Rocks and Minerals	<b>Mechanical Engineering</b>
		<b>Gr. 5</b>	Technological problem-solving skills to design, build and test a device that transforms one type of energy into another; Law of Conservation of Energy	Understanding Earth and Space Systems: Conservation of Energy and Resources	<b>Mechanical Engineering</b>
		<b>Gr. 7</b>	Environmental and economic impacts of using conventional and alternative forms of energy	Understanding Earth and Space Systems: Relating Science and Technology to Society and the Environment	<b>Mechanical Engineering</b>
<b>Circuit Mazes (ME-2)</b>	Students will explore the concept of closed circuits as they design and create a circuit maze system.	<b>Gr. 3</b>	Safety procedures during science and technology investigations; effects of increasing or decreasing amount of force or energy applied to an object	Understanding Matter and Energy: Developing Investigation and Communication Skills	<b>Electrical Engineering</b>
		<b>Gr. 4</b>	Technological problem-solving skills to design, build, and test a device that makes use of the properties of light or sound	Understanding Matter and Energy: Light and Sound	<b>Electrical Engineering</b>
		<b>Gr. 6</b>	Designing and building series and parallel circuits, drawing labelled diagrams, identifying the components used in each, and describing the role of each component in a circuit	Understanding Matter and Energy: Electricity and Electrical Devices	<b>Electrical Engineering</b>
<b>Slime &amp; Polymers (ME-3)</b>	Students will formulate and synthesize polymer creations.	<b>Gr. 3</b>	Investigate and understand the various properties of liquids and solids	Understanding Matter and Energy: Properties of Liquids and Solids	<b>Chemistry / Chemical Engineering</b>
		<b>Gr. 5</b>	States of matter; properties of solids, liquids and gases; physical and chemical changes	Understanding Matter and Energy: Properties and Changes in Matter	<b>Chemistry / Chemical Engineering</b>
		<b>Gr. 7</b>	Properties of pure substances and mixtures; particle theory of matter; experimentation skills to investigate the properties of mixtures and solutions	Understanding Matter and Energy: Pure Substances and Mixtures	<b>Chemistry / Chemical Engineering</b>

## UNDERSTANDING SPACE & EARTH SYSTEMS

WORKSHOP TITLE	ACTIVITY DESCRIPTION	GRADE	TOPICS	ONTARIO CURRICULUM CONNECTION	UNIVERSITY DISCIPLINE CONNECTION
<b>Extreme Roller-Coasters (SE-1)</b>	Students will design, build and test model roller-coasters, while applying laws of physics and principles of design.	<b>Gr. 5</b>	Technological problem-solving skills to design, build and test a device that transforms one type of energy to another; Law of Conservation of Energy. Identify a variety of forms of energy; describe how energy is stored	Understanding Earth and Space Systems: Conservation of Energy and Resources	<b>Mechanical Engineering</b>
		<b>Gr. 6</b>	Characteristics of the components of the systems of which the Earth is a part; phenomena that result from the movement of different bodies in space	Understanding Matter and Energy: Space	<b>Mechanical Engineering</b>
		<b>Gr. 7</b>	Environmental and economic impacts of using conventional and alternative forms of energy	Understanding Matter and Energy: Relating Science and Technology to Society and the Environment	<b>Mechanical Engineering</b>

## UNDERSTANDING SPACE & EARTH SYSTEMS (CONT.)

WORKSHOP TITLE	ACTIVITY DESCRIPTION	GRADE	TOPICS	ONTARIO CURRICULUM CONNECTION	UNIVERSITY DISCIPLINE CONNECTION
Water Filters (SE-2)	Students will design, construct and test water filters to help understand issues of water pollution and the importance of access to clean water.	Gr. 2	Impact of human activities on air and water in the environment; responsible uses of water; necessity of water for the life of most animals and plants; identify sources of water in the natural and built environment	Understanding Earth and Space Systems: Air and Water in the Environment	Civil Engineering / Material Engineering
		Gr. 3	Impact of human action on soils; describe the interdependence between the living and non-living things that make up soil	Understanding Earth and Space Systems: Soils in the Environment	Civil Engineering / Material Engineering
		Gr. 8	Evaluate personal vs. global water consumption; propose a plan of action to reduce personal water consumption to help address water sustainability issues; identify the various states/distribution of water on the earth's surface' explain how human and natural factors cause changes in the water table	Understanding Earth and Space Systems: Water Systems	Civil Engineering / Material Engineering
Rocket Science (SE-3)	Students will build and test rockets to investigate the principles of aerodynamics.	Gr. 4	Social and environmental costs and benefits of using objects in the built environment that are made from rocks and minerals	Understanding Earth and Space Systems: Rocks and Minerals	Aerospace Engineering
		Gr. 6	Components of the solar system; technological tools and devices needed for space exploration; physics of flight and forces acting on an object in flight	Understanding Earth and Space Systems: Rocks and Minerals	Aerospace Engineering
		Gr. 7	Social and environmental benefits of technologies that reduce heat loss or transfer; environmental and economic impacts of using conventional and alternative forms of energy	Understanding Earth and Space Systems: Heat in the Environment	Aerospace Engineering

## FULL DAY WORKSHOPS

WORKSHOP TITLE	ACTIVITY DESCRIPTION	GRADE	TOPICS	ONTARIO CURRICULUM CONNECTION	UNIVERSITY DISCIPLINE CONNECTION
A.I. Bots (FD-1)	Students will learn about robotics and fundamental coding and problem solving skills.	Gr. 4	Technological problem-solving skills to design, build, and test a device that makes use of properties of light or sound	Understanding Matter and Energy: Light and Sound	Robotics / Computer Science
		Gr. 6	Technological problem-solving skills to design, build and test a device that transforms electrical energy into another form of energy in order to perform a function	Understanding Matter and Energy: Electricity and Electrical Devices	Robotics / Computer Science
		Gr. 7	Evaluation of the importance for individuals, society, the economy, and the environment of factors that should be considered in designing and building structures and devices to meet specific needs	Understanding Structures and Mechanisms: Form and Function	Robotics / Computer Science
Sustainable Urban Planning (FD-2)	Students will work to plan an eco-city of the future with consideration of environmental impact and energy conservation.	Gr. 4	Positive and negative impacts of human interactions with natural habitats and communities, taking different perspectives into account, and evaluations of ways of minimizing the negative impacts	Understanding Life Systems: Habitats and Communities	Civil Engineering / Industrial Engineering
		Gr. 5	Scientific inquiry/research skills to investigate issues related to energy and resource conservation; effects of various technologies on energy consumption	Understanding Earth and Space Systems: Conservation of Energy and Resources	Civil Engineering / Industrial Engineering
		Gr. 7	Assess the impact of selected technologies on the environment; costs and benefits of selected strategies for protecting the environment	Understanding Life Systems: Interactions in the Environment	Civil Engineering / Industrial Engineering



# IN-SCHOOL WORKSHOPS 2019 / 2020 BOOKING FORM

For online registration, please visit [www.uoft.me/isw](http://www.uoft.me/isw)

## CONTACT INFORMATION

MAIN CONTACT:

FIRST NAME

LAST NAME

PHONE NUMBER

EMAIL ADDRESS

SCHOOL:

SCHOOL NAME

BOARD

ADDRESS:

STREET NO. & NAME

CITY

POSTAL CODE

NEAREST INTERSECTION TO SCHOOL

PHONE:

PHONE

EXTENSION

## WE OFFER IN-SCHOOL WORKSHOPS ON A LIMITED BASIS FROM OCTOBER TO DECEMBER 2019 & JANUARY TO APRIL 2020

To schedule workshops on specific dates, please email your preferred dates to [outreach@ecf.utoronto.ca](mailto:outreach@ecf.utoronto.ca) to check availability before submitting this form. Full-time scheduling will resume in May 2020.

**Which dates would you prefer us to visit your school?**

REQUESTED DATE:

ALTERNATIVE DATE:

**To help us schedule your workshops, please provide your school schedule:**

START:

LUNCH:

END:

## WORKSHOP REQUESTS

**Please note:** Each workshop can accommodate a maximum of 30 students and is offered at your school. Please email us at [outreach@ecf.utoronto.ca](mailto:outreach@ecf.utoronto.ca) for more information.

TEACHER	GRADE	# OF STUDENTS	WORKSHOP TITLE	START TIME	END TIME
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					

If you are not booking online, please email or mail this form to us. After we receive your form, we will send you a confirmation and invoice to the email address provided. Workshops are not officially booked until you receive confirmation. We look forward to hearing from you!

## CONTACT IN-SCHOOL WORKSHOPS

In-School Workshops, University of Toronto 35 St. George Street, Room 173, Toronto ON M5S 1A4  
Canada Email: [outreach@ecf.utoronto.ca](mailto:outreach@ecf.utoronto.ca) | Online registration: [www.uoft.me/isw](http://www.uoft.me/isw) | Tel: 416-946-0816





## HOW TO BOOK AN IN-SCHOOL WORKSHOP

- 1 Select your workshops.** We offer a wide range of workshop topics that are grade-specific, fun and kid-friendly. Each half-day workshop is 2.5 hours in length, while full-day workshops are 5 hours in length. We are pleased to offer special pricing on workshop packages for schools. If other teachers in your school are interested in booking workshops, we encourage you to book together to save money. Please note, each workshop can accommodate a maximum of 30 students.
- 2 Complete the booking form.** We schedule workshops on a first-come-first-served basis. Book early for preferred dates!
- 3 Send your completed form to our office by mail:**

**BY EMAIL:** [outreach@ecf.utoronto.ca](mailto:outreach@ecf.utoronto.ca) **DOWNLOAD THE FORM:** [www.uoft.me/isw](http://www.uoft.me/isw)

The University of Toronto's Faculty of Applied Science & Engineering is committed to inspiring young minds in the areas of science, technology, engineering and math (STEM). We achieve this through a wide range of year-round, hands-on programs for children of all ages. Last year, we reached more than 5,000 pre-university youth. Some of our programs include:

**JR. DEEP (SUMMER, GR. 3–8)**

**GIRLS' JR. DEEP (SUMMER, GR. 3–8)**

**JR. DEEP SATURDAYS (FALL AND WINTER, GR. 3–8)**

**GIRLS' JR. DEEP SATURDAYS (FALL AND WINTER, GR. 3–8)**

**JR. DEEP AT MARCH BREAK (MARCH, GR. 3–8)**

**DEEP SUMMER ACADEMY (SUMMER, GR. 9–12)**

**DEEP LEADERSHIP CAMP (SUMMER, GR. 10–12)**

## After you receive your confirmation, leave the rest to us!

Our instructors will bring the necessary materials for all activities.



## Engineering

### ENGINEERING OUTREACH OFFICE, UNIVERSITY OF TORONTO

35 St. George Street, Room 173, Toronto, ON M5S 1A4 Canada

Email: [outreach@ecf.utoronto.ca](mailto:outreach@ecf.utoronto.ca) | [www.outreach.engineering.utoronto.ca](http://www.outreach.engineering.utoronto.ca)

Tel: 416-946-0816

## WORKSHOP PACKAGES & PRICING

Booking In-School Workshops with other teachers in your school is the most cost-effective way to bring these enriching workshops to your classroom. Packages can be split among different grade levels and classrooms (maximum 30 students per workshop) within your school, but all workshops must occur on the same day.

### SCHOOL PACKAGE I: FULL-DAY \$1,560

12 workshops @ 2.5 hrs each

### SCHOOL PACKAGE II: HALF-DAY \$875

6 workshops @ 2.5 hrs each

### INDIVIDUAL WORKSHOPS

1 workshop @ 2.5 hrs each **\$170**

1 workshop @ 5 hrs (full day) **\$310**

Priority will be given to schools with multiple bookings.



Actua provides training, resources and support to its national network of members located at universities and colleges across Canada in the delivery of science, technology, engineering and mathematics (STEM) education outreach programming. Each year, these members engage over 225,000 youth in 500 communities nationwide. Please visit Actua at [www.actua.ca](http://www.actua.ca).

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Ontario Trillium Foundation

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