Engineering Science Qube

• Mobile Makerspace •

SCHOOL WORKSHOPS

ESQube is an in-school workshop initiative operated by the Engineering Outreach team at the University of Waterloo. We are strong believers that sparking appreciation for Science, Technology, Engineering, and Math (STEM) at an early age is valuable, and ESQube wants to give ALL youth the opportunity to engage in these hands-on experiences.

ESQube is excited to offer FREE STEM workshops to students in Kindergarten to Grade 8. Look inside at our offerings and let us know if there are any programs your school may be interested in hosting.

Engineering Outreach
UNIVERSITY OF WATERLOO

Engineering Science Qube
Mobile Makerspace

WORKSHOPS

Grades K - 8

TOPICS

★ New!

Grade	CODING & MATH	ENGINEERING DESIGN + BUILD	SCREENLESS CODING
Kindergarten	★ SHAPE SAFARI (K-2)	Kinder-STEM	
PRIMARY Grade 1-3		TWISTER HIDEOUT	OZOCITY BUILDERS
	OSMO	SLIPPERY SLOPE	MATATA ECOSYSTEMS ★
JUNIOR Grade 4-6	MICRO:BIT MESSENGERS ★	RED ALERT	★ MATATA ARTISTS
	FRAME FLIPPIN' FUN	IN BRIDGES WE TRUSS	
INTERMEDIATE Grade 7-8	OZO CYBER TRAINING (Gr. 6-8) ★	WATTS IN THE WIND	New Coding Tech! 
	DIGITAL DAVINCI	BUILD, SCRAP, REPEAT!	
	INTERTWINED TALES		

- All workshops (except Kinder STEM) run for 60-75 minutes and are designed for a maximum of 30 students
- All CODING workshops (except OSMO & Shape Safari) require students to have their own laptop/Chromebook with internet access
- All materials will be provided for DESIGN + BUILD and SCREEN-FREE DIGITAL SKILLS workshops
- All workshops are altered with simplifications and extensions to best support learning at each grade level

CODING & MATH

Osmo | Grade 1-3

Students will learn the basics of coding through an Osmo iPad block coding activity. Students use puzzle-like pieces to practice coding and help the character, Awbie, navigate through challenging mazes.

Curriculum Links: Coding (A2)

Shape Safari | Grade K-2

Students will explore the connections between math and nature through reading an exciting story about the many different shapes in nature. Students will then design and build an animal shelter using as many shapes and patterns as possible!

Curriculum Links: Language (C2), Math (C1, E1), Science and Technology (B2)

Micro:bit Messengers | Grade 4-6

Students will use block coding to program Micro:bits and explore how radio signals work by sending secret messages to their peers. This workshop will highlight the importance of cybersecurity and reinforce awareness of digital footprints.

Curriculum Links: Coding (A2), Applications (A3)

Frame Flippin' Fun | Grade 4-6

Students will learn about digital screens and optics by using block coding and micro:bits to create animations. Students will also explore computer logic, inputs/outputs and hardware during this workshop with fun micro:bit challenge cards!

Curriculum Links: Coding (A2), Visual Art (D1)

Ozo Cyber Training | Grade 6-8

Students will code Ozobots - tiny robots that follow colour coded paths - to navigate a cyber-safe themed maze! Students will learn about traditional and AI edited content and will learn how to recognize reliable sources.

Curriculum Links: Coding (A2), Language (A2)

Digital DaVinci | Grade 7-8

Students will create computer programs which generates dynamic pieces of art. Using the same algorithm used for CGI in movies and video games, students will explore how colour, geometry, and images translate into digital spaces, and draw connections between patterns in art and mathematics.

Curriculum Links: Coding (A2), Programming (B1), Visual Art (D1)

InterTWINED Tales | Grade 7-8

Students will use Twine, an open source web-based tool, to create their own interactive non-linear story or game. This coding activity will explore the importance of syntax, variables, and IF statements in computer programming.

Curriculum Links: Coding (A2), Programming (B1), Language

ENGINEERING: DESIGN + BUILD

Kinder-STEM | Kindergarten

Students will be introduced to STEM - Science, Technology, Engineering and Math. Students will apply their learning by participating in fun STEM related challenges and games!

Twister Hideout | Grade 1-3

Students will learn about tornadoes, safety procedures, and the importance of building strong, stable shelters. They will then apply this knowledge using the engineering design process by constructing a sanctuary for an animal using various design materials.

Curriculum Links: Engineering (A1), Structures and Mechanisms (D2)

Slippery Slope | Grade 1-3

Students will design and build their own Plinko-style game to explore key concepts such as as simple machines (inclined planes), forces in motion (gravity and friction), and how changing weather conditions (rain, snow, ice) affect motion.

Curriculum Links: Engineering (A1), Matter and Energy (C1), Structures & Mechanisms (D2)

Red Alert | Grade 4-6

Students will design a Mars base that can protect against falling meteors. Students will learn about gravity and objects in free fall before designing a structure that can withstand such forces.

Curriculum Links: Engineering (A1), Structures and Mechanisms (D2), Earth & Space Systems (E2)

In Bridges We Truss | Grade 4-6

Students will become civil engineers by designing and building their own truss bridge using craft materials. Once it's complete, students will test how much weight it can hold before it breaks! Can their bridge handle the challenge? Let's find out!

Curriculum Links: Engineering (A1), Structures and Mechanisms (D1)

Watts in the Wind | Grade 7-8

Working in groups, students will design and build their own electrical wind-turbine and quantify how much voltage can be generated, all while learning about renewable energy, and using the engineering design process!

Curriculum Links: Engineering (A1), Matter & Energy (C1 & C2)

Build, Scrap, Repeat | Grade 7-8

Students will encounter the ultimate engineering challenge: using the same set of materials to solve three different problems. By applying the engineering design process and working together, they will present their prototypes and impress the judges!

Curriculum Links: Engineering (A1), Structures and Mechanisms (D1)

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SCREEN-FREE

OzoCity Builders | Grade 1-3

Students will step into the role of city planners and engineers as they design and build their very own city! Using Ozobots – tiny robots that follow color-coded paths – students will map out roads, buildings, parks, and more, creating a vibrant city landscape. They'll use color codes to program their Ozobot to navigate through their city, learning the basics of coding and problem-solving along the way.

Curriculum Links: Engineering (A1), Coding (A2), Global & Local Communities (B1-3)

Matata Ecosystems | Grade 1-3

Using the Matata Studio Coding Set–a screen-free, hands-on block coding toolkit–students will explore a variety of ecosystems as they code their way through exciting challenges. With thinking caps on and problem-solving in full gear, students will navigate obstacles, plan routes, and bring their coding adventures to life in a fun, tactile way.

Curriculum Links: Coding (C3), Life Systems (B2)

Matata Artists | Grade 4-6

In this creative coding challenge, students will become artists and engineers as they use the Matata Studio Coding Set - a screen-free, hands-on block coding toolkit - to design geometric masterpieces! By programming precise turns and movements, they'll explore angles, patterns, and spatial reasoning–proving that math and art make the perfect pair.

Curriculum Links: Coding (C3), Spatial Sense (E1), Visual Art (D1)

BOOK NOW!

Schedule workshops for your school today using our online booking portal:

- Book through our Calendly Portal - link found on the ESQube webpage!
- Select an available day that fits your schedule
- Answer all the questions to provide us with info about each class you wish to book
- You will receive a booking confirmation from Calendly, and our ESQube Team will reach out by email to finalize the booking with you.
- **Note: It is our goal to reach as many youth as possible. Please work with your colleagues to fill the daily schedule. One workshop per class.**

FAQ's ?

Is there a cost to book an ESQube School Workshop?

A: All workshops are provided for FREE within the program areas, noted below.

Where are the ESQube program areas?

A: ESQube workshops are delivered only to schools in Waterloo Region (Cambridge, Kitchener, Waterloo and Townships) & surrounding counties in Huron, Oxford and Perth within a 1-hour drive of UWaterloo Waterloo Campus. If you are unsure if your school qualifies, please email us with your school's name and address.

How long is a session?

A: Grade 1-8 workshops require a 60-75 minute time slot. Kinder-STEM workshops are 45 minutes.

How many workshops can I book in a single school day?

A: This will depend on your school's daily schedule and how much travel is needed but we aim to schedule 3 workshops in a day.

How many days can my class book?

A: To ensure we are reaching as many classes as possible, we ask that classes book a maximum of one workshop each school year (Sept 2025 - June 2026).

How many students can participate in one session?

A: In order to ensure each student's learning can be supported by our two-person teaching team, we suggest booking single classes of up to 30 students per session.

ANY OTHER QUESTIONS? →

engoutreach2@we-connect.ca for ESQube booking questions, or engoutreach@uwaterloo.ca for general inquiries

WAIT...THERE'S MORE

UW Engineering Outreach offers a range of other programs for students of all ages including:

- 'Kids On Campus' field trips to UW for Grade 4 classes
- STEM Nights at your school for all students and their families
- After school programs at UW and in the community
- March Break, PD Day & Summer STEM Camps for learners of all ages

Visit uwaterloo.ca/engineering-outreach for details!

Stay updated by signing up to our mailing lists:

Engineering Outreach Teacher Mailing List:
mailchi.mp/uwaterloo/weo-educator-mailing-list

Engineering Outreach General Mailing List:
mailchi.mp/uwaterloo/engineering_outreach

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