



Young Women's Career Exploration Event



Moveable Bridge Challenge

This school year, as a part of Skills Ontario's Young Women's Virtual Career Exploration Events, we are offering a free optional challenge that your registered class can participate in for a chance to win a prize! Two weeks prior to each Virtual Career Exploration Event date, this scope will be emailed to those who registered. **The top creative design will win a \$250 e-gift card and will be announced during the event!**

Please note that this scope can also be incorporated into any classroom as an activity outside of the Virtual Career Exploration Event, but in that case, there is no opportunity for submission nor any chance to win a prize.

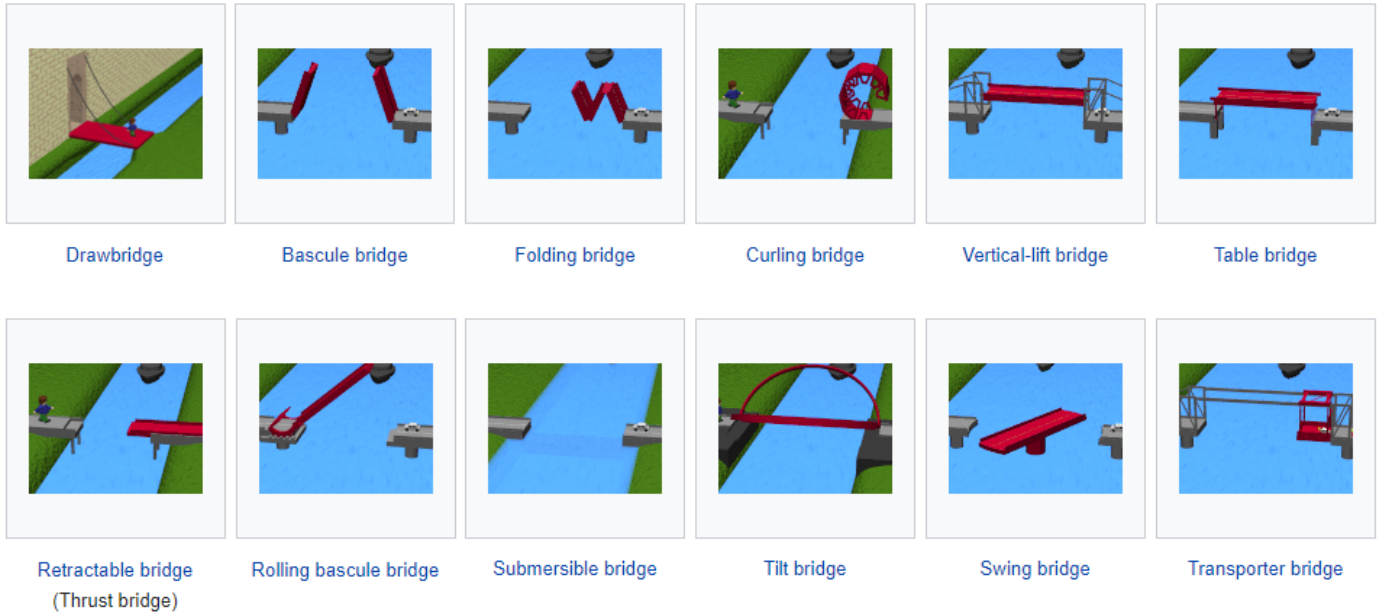
Along with developing skills in teamwork and problem-solving, you will learn about the various types of moveable bridges and the skilled trade and technology disciplines that go into making them and keeping them running.

Skills Ontario wants you to design, build, and test a moveable bridge (drawbridge) out of common everyday materials that you can find at home or in your classroom, while learning about the skilled trades and technologies!

1. This challenge is open to all grade 7-12 classes (co-ed for class cohorts and bubbles for 2020-2021) that are registered for a Career Exploration Event with Skills Ontario (details and registration at skillsontario.com/young-womens-initiatives#CEE).
2. Each registered class can submit **one (1)** project each. It is recommended that classes hold an internal class challenge, where teams of students create their bridge, then have a class vote on the bridge they wish to submit to represent their class.
 - a. For online classes, students could make their own bridge at home, and still vote together as an online class.
3. The selected bridge will need to be recorded with a ten (10) second video of their bridge moving in action.
4. Submit the video to the Skills Ontario website (see submission section below) two (2) business days prior to the event date by 4 pm. The exact date will be noted in the email sent to the person who registered with a copy of these instructions.
5. All entries will be reviewed and judged based upon the intricacy and creativity of the design submitted. **The top creative design will win a \$250 e-gift card and will be announced during the event!**

Different Types of Moveable Bridges

- | | |
|-------------------------|---------------------------|
| 1. Drawbridge | 7. Retractable Bridge |
| 2. Bascule Bridge | 8. Rolling Bascule Bridge |
| 3. Folding Bridge | 9. Submersible Bridge |
| 4. Curling Bridge | 10. Tilt Bridge |
| 5. Vertical-lift Bridge | 11. Swing Bridge |
| 6. Table Bridge | 12. Transporter Bridge |



Visit [wikipedia.org/wiki/Moveable_bridge](https://www.wikipedia.org/wiki/Moveable_bridge) as an external reference to learn about the different types of moveable bridges that you can design and submit.

Materials

Students may use any materials or recyclables they find around the house, classroom, or school. There are no restrictions to the materials they could use for this challenge.

Some suggestions for materials include:

- a) Cardboard
- b) String/twine/yarn
- c) Toothpicks
- d) Skewer sticks
- e) Pencils
- f) Balsa wood
- g) Tape (any kind)
- h) Hot glue and a glue gun
- i) Super Glue
- j) Spools/cardboard cylinder tubes

SAFETY NOTE: If using electrically powered devices (i.e. hot glue guns) or cutting tools (i.e. scissors or X-ACTO knives) to create your project, please ensure that proper caution and care is exercised and that a parent/guardian/teacher is present.

Project Submission

As noted, this scope can be incorporated into any classroom as an activity outside of the Virtual Career Exploration Event, but in that case, there is no opportunity for submission nor any chance to win a prize.

To enter a project as part of a Virtual Career Exploration Event and to vie for a prize:

1. Submit your video (2) business days prior to the Virtual Career Exploration Event date by 4 pm. Two weeks prior to the event date you registered for, the exact due date will be noted in an email sent to the contact who registered, along with a copy of these instructions.
2. Ensure the video is no longer than ten (10) seconds and that it clearly shows the drawbridge in action.
3. Visit <http://www.skillsontario.com/bridge-challenge-young-womens-career-exploration-events> to submit your video through the Skills Ontario website.
 - a. The maximum file size is 1GB.
 - b. File naming convention: teacher name_school name_school board_YWI Bridge
 - c. If there are any issues with the video submission, please email nkomarnitsky@skillsontario.com.

All entries will be reviewed and judged based upon the intricacy and creativity of the design submitted. **The top creative design will win a \$250 e-gift card and will be announced during the event!**

What Skilled Trades are Involved in Building Bridges?

There are many different skilled trades that take part in the process of building a bridge and keeping it running – from landscapers and welders to carpenters and mobile crane operators. In this document, you can learn about some of these skilled trade professions and the roles they play in building and maintaining a bridge:

Welder

Welders use heat or electricity to fuse steel or other metals together. Welders often weld the various points together on a bridge to ensure the bridge's structural integrity. Welders:

- Install metal roofing or walls
- Fabricate and assemble metal parts

Electrician

Many bridges also help sustain important infrastructure, such as power and sewer lines. Moveable bridges also require the use of electricity to function, as so do their signals. It is an electrician's job to ensure that all electrical functions are maintained and remain in safe working order. Electricians:

- Provide temporary electrical service to work sites
- Place electrical and telecommunication cables under bridges
- Develop control systems (for signals and signage)
- Install alarms and emergency notification systems, lighting systems, and telecommunications systems

Heavy Equipment Operator

Heavy Equipment Operators use machinery such as Dozers and Excavators to move earth and other materials to meet the design specifications of the bridge. Not only do Heavy Equipment Operators need to know how to operate their machinery, but they also need to know how their machinery works internally.

Crane Operator

A Crane Operator moves heavy equipment and materials from one place to another. They transport materials that are too heavy to move easily and move materials to very high or very low locations. They often work closely with colleagues on the ground, who direct their movements using radio voice commands or hand signals. Crane Operators may use a variety of different cranes, including tower cranes, mobile cranes, and boom trucks to perform their duties. Crane Operators:

- Place prefabricated bridge components into place for ironworkers or welders to install
- Unload and load materials

Brick Mason

Brick Masons help lay, support, and level walls, foundations, and other structures made from brick and mortar. They must be very meticulous with their work and must have a keen eye for detail! Brick Masons may help create culverts that hold and support the foundation of a bridge. Brick Masons:

- Lay bricks, grout, and complete repairs, especially on historic structures
- Pour concrete for foundations, surfaces, and barriers
- Construct retaining walls
- Install insulation and acoustical elements
- Construct culverts
- Lay curbs
- Pour and finish sidewalks

Glazier

Not all bridges use glass in their construction, but some do! And when they do, they call on Glaziers to help measure, cut, and install glass. Glass can be difficult to work with, as it is heavy, hard to cut, and can be sharp. It takes a trained person to know how to deal with this delicate material.

Painter

Painters help during all steps of construction, including coating materials to ensure they don't rust and helping make outer structures look more visually appealing. Painters have a very keen eye for detail as they are usually involved with the finishing touches of a project.

Plumber

Most people don't think about Plumbers when it comes to bridges, but there is actually a lot of plumbing that goes into the construction of a bridge, such as connecting sewer lines and installing drainage systems to ensure the foundation doesn't erode. A Plumber helps water move throughout a structure. Plumbers:

- Install drainage systems
- Connect sewer lines

Heating, Ventilation and Air Conditioning (HVAC) Technician

An HVAC Technician helps keep air circulating within structures. On a bridge, they can assist with building ventilations and installing mechanical components. HVAC Technicians are used to solving problems and thinking on their feet. HVAC Technicians:

- Build ventilation systems
- Hook up gas lines and hanging pipelines

Sheet Metal Worker

A Sheet Metal Worker uses their knowledge of metal alloys to create objects out of raw metal materials. On a bridge, a Sheet Metal Worker installs metal siding to structures, creates ornamental figures, fabricates guardrails, and reinforces concrete structures. Sheet Metal Workers:

- Complete architectural and structural sheet metal work
- Install water removal systems and ventilation duct work
- Fabricate and install guard rails
- Fabricate steel and reinforced concrete components

Ironworker

Ironworkers follow blueprints to hoist and install structural steel as well as precast concrete, concrete reinforcing materials, and other metals used in construction. They set up the framework of a structure by positioning steel girders or other structural elements and then bolting them into place.

To learn more about how to become a certified tradesperson in Ontario, visit:
[ontario.ca/page/list-skilled-trades-ontario](https://www.ontario.ca/page/list-skilled-trades-ontario).

Resources: bridgemastersinc.com/contractors-behind-bridge-projects.