



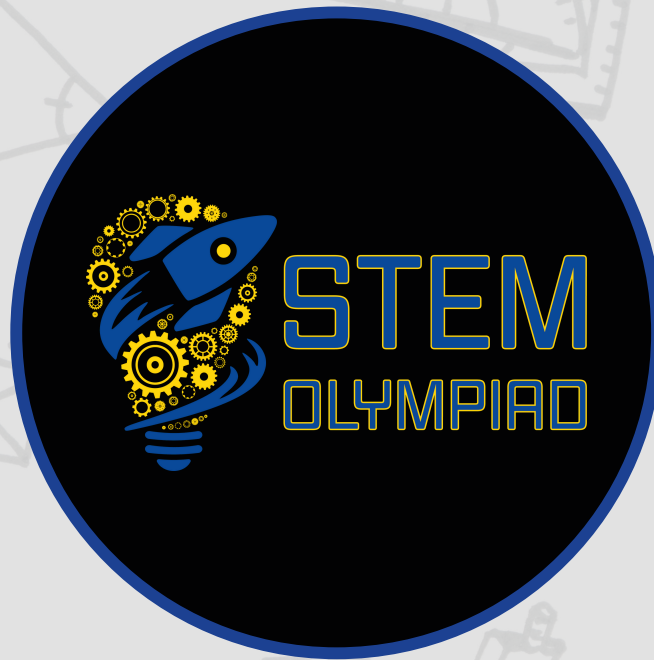
STEMducate

STEM  
OLYMPIAD

# COMPETITION MANUAL

2022 Season

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# Competition Guidelines

The STEM Olympiad is an annual competition in which teams of students compete to win awards, test and learn new STEM skills, and complete STEM projects. **Teams may consist of 1 to 5 students.** The 2022 Competition kicked off on September 21st, 2022 and will last 2 months **until November 16th, 2022 at 11:59 PM.** We have an elementary, middle, and high school challenge. Students are eligible to compete in any challenge of a grade level **higher** than their own. This means elementary and middle schoolers can compete in the middle or high school competitions, however, high schoolers can only compete in the high school competition. Each year, as the transportation and automotive industry innovates to bring consumers, like you, safer, cooler, and mind-blowing new and improved forms of transportation, it is a combination of hard-working STEM leaders needed to get it done. Scientists, technologists, engineers, and mathematicians are put to work by these car companies to innovate, design, test, and manufacture these incredible machines. This year, the theme for the STEM Olympiad is **Tremendous Transportation.**

[www.stemducate.org](http://www.stemducate.org)



# Elementary School Competition

## Efficient Car Ramp Challenge

### Challenge Overview:

In the modern world, vehicles are designed to push the known boundaries of engineering through breaking speed records. For the elementary school competition, students will design a ramp suitable for use with a Hot Wheels sized toy car. Their goal will be to have their car travel as fast as possible once exiting the ramp. The instantaneous speed of their car will be measured once its back wheels have reached 1 meter from the endpoint of the ramp. The fastest car wins!

### Design Specifics:

Neither the ramp apparatus nor car may use outside forces to increase the speed of their car. This includes but is not limited to using elastic bands to initially propel the car or using chemical combustions to increase the speed of the hot wheels car. The entire ramp apparatus must fit inside a 50x50x50cm sizing cube. The ramp must be freestanding and no outside force can be used to keep it upright or stable.

### Testing Procedure:

A STEMducate volunteer will confirm that your apparatus will fit within the sizing cube. Participants will place and hold their car at the top of their ramp.

Participants, with STEMducate volunteer approval, will release their car, and a STEMducate volunteer will measure the instantaneous speed of the car once its back wheels reach a meter out from the endpoint of the ramp.





# Middle School Competition

## Sustainable Vehicle Design Challenge

### Challenge Overview:

Sustainable vehicles are becoming more popular every day with issues such as climate change, and rising gas prices propelling their popularity. For the middle school competition, students will make a small, sustainably powered car without the incorporation of any electronics or batteries. Examples could include a rubber band, water wheel, or even balloon powered cars.

### Design Specifics:

For the design of your sustainable vehicle, you may use any materials as long as you do not incorporate any electronics or battery powered components. The device must be sustainably powered, including powering through water, wind, elasticity (rubber band), or other non-electric sustainable power sources. The vehicle must weigh less than 2 kg. and fit within a 20x20x20 cm. sizing cube.

### Testing Procedure:

To test the sustainable vehicle, you will be given the opportunity to set up your vehicle in a designated starting zone where the outermost edge of the vehicle will sit parallel to the start line. The vehicle will then be released and the final location of the outermost edge of the vehicle will be tracked to determine how far the vehicle traveled. This test will be completed 3 times and the average distance travelled by the car will be used to determine the winning vehicle. The vehicle that travels the furthest distance will be the winner of the challenge. In the event of a tie, the vehicle that weighs the lowest amount will be crowned the winner.





# High School Competition

## Skybridge Design Challenge

### Challenge Overview:

For the high school competition, your local school is looking to build a new skybridge between your school and the public library in order to allow students to easily get to the library without the need of extra buses. Your job is to design a model bridge fit to the specifications of the school district, being twenty inches long and weighing less than 500 grams and create a presentation pitch where you will persuade the school to construct your bridge. Each bridge will be tested for endurance and strength. The team whose bridge holds the most weight and for the longest time will be selected for the construction contract!

### Design Specifics:

For the design of your skybridge, you may use any materials, but the overall weight of the bridge must be less than 500 grams. The overall length of the model bridge must be 50 cm, this is in order to scale with the school's specified 60 meter length, at a 5 centimeter = 6 meter scale. The type of bridge, or truss shape is free to be experimented with, as any shape or design is acceptable as long as it is 50 cm long, and equal to 10 cm. wide.

### Testing Procedure:

To test the skybridge, a STEMducate volunteer (for in person events) or an adult supervisor (for virtual events) will slowly stack 2kg textbooks on top of the bridge.

This will be done one by one, until the bridge fails to hold the weight of the textbooks for a 25 second time period. All bridges that hold the highest amount of textbooks will then be judged based on design to determine the winner of the competition.



## Contact Us

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## About STEMducate

STEMducate is a non-profit organization dedicated to creating and promoting STEM to students from a young age to increase their curiosity and imagination. Our goal is to expose students to STEM opportunities and careers, enabling them to dream big and make their dreams a reality. We provide positive and powerful opportunities and experiences in STEM fields for people of all ages. These initiatives will hopefully entice students toward becoming the next innovators, educators, researchers, and leaders. We aim to reduce the number of unfilled jobs due to the lack of specialized skills that are needed to perform job tasks.

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