

Science  
on tour!

29<sup>th</sup>

INTERCOLLEGIATE  
SCIENTIFIC  
COMPETITION

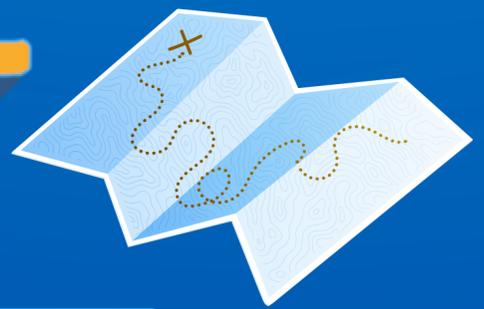
# THE TRAVELLING RESERVOIR



PRESENTED BY



# PROVINCIAL FINALS



**MAY 6 & 7, 2022**

*École nationale d'aérotechnique,  
Longueuil*

# TEAM MEMBERS

- No more than three members are allowed per team.
- All members of your team must be registered with the same educational institution, as you will represent this institution if you make it to the provincials.
- No student may be part of more than one team or present more than one device.
- A team's members cannot change between the locals and provincials.
- Teams must give their device an original name that is not trademarked. Device names cannot be changed between the locals and provincials.

# TWO CATEGORIES OF PARTICIPANT

## ***Professional category***

This category is open to all public and private college students in Quebec. Participants can be youth or adults enrolled in full or part-time classes in regular or continuing education in any program.

## ***Amateur category***

This category is open to all employees of public and private colleges in Quebec.

# LOCALS AND PROVINCIALS

**There are two sets of finals. To make it to the provincials, you will first need to excel at your college's locals!**

Locals will be held from February 14 to April 6, 2022. Each institution will organize its own locals, where teams will compete in their respective categories. It is up to each college to determine the prize that will be awarded to winners at their locals. The winning teams from each institution will receive an invitation to the provincials (one team per category per college).

**The provincials will be hosted by *École nationale d'aérotechnique* on May 6 and 7, 2022.**

At this event, the winning teams from colleges' *Professional* and *Amateur* categories will face off. The provincials will be open to public viewing.

## USEFUL RESOURCES

Each college will make a reference person available to answer any questions you may have regarding the challenge or Science, on tourne! in general. Contact your college's Student Services to get in touch.

You may also consult our online FAQ.

1

# THE CHALLENGE



**Build a device capable of quickly travelling in an “L” shape, using only the energy from mousetrap springs, while carrying a two (2) litre reservoir containing one (1) litre of water.**

## 2

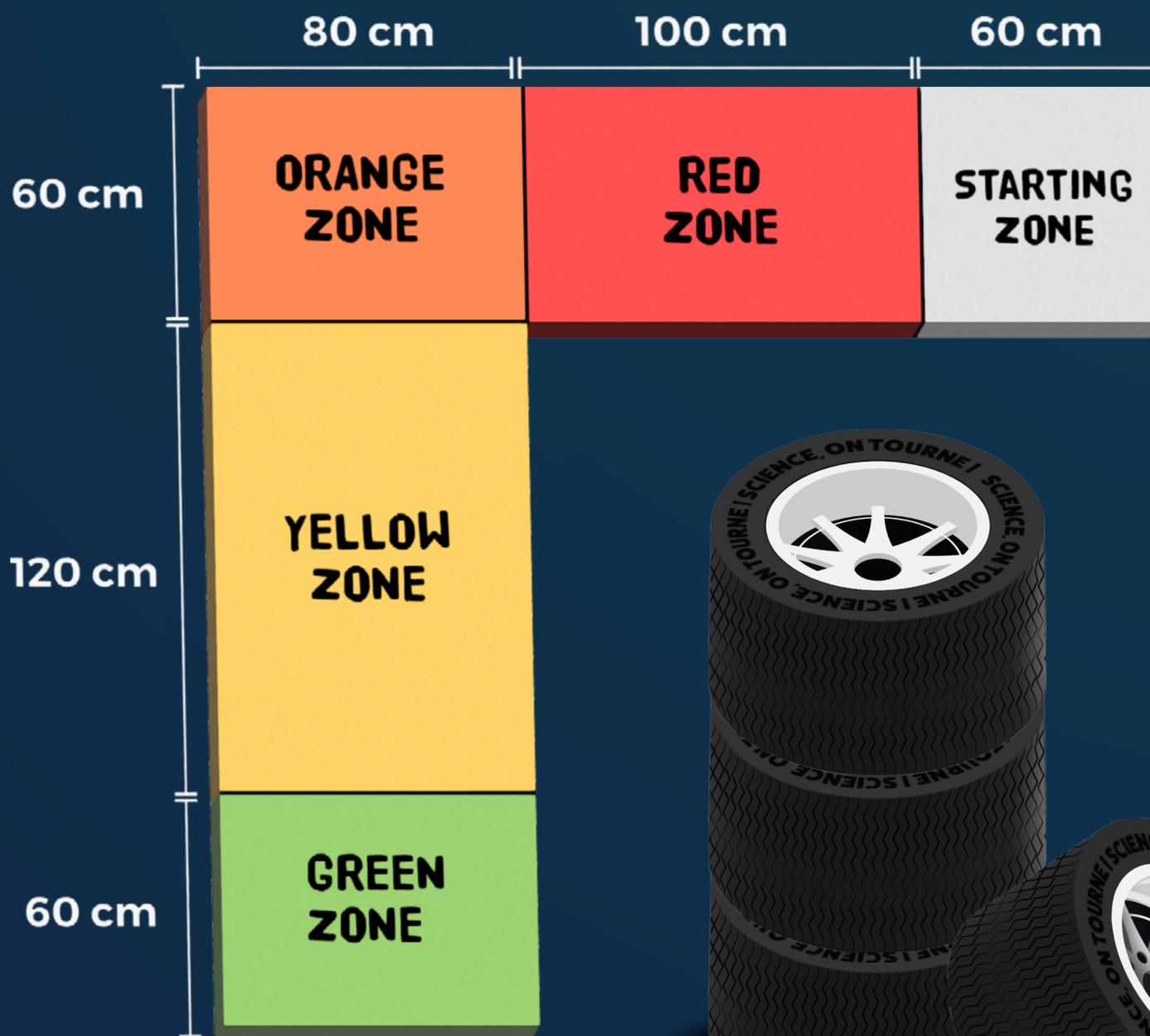
# SCORING

$$P = 1 + \frac{Z_{yellow} + Z_{green}}{T_{red}}$$

- 2.1 100 points are awarded for *Z<sub>yellow</sub>* if all points of contact on the device reach the yellow zone. If they do not, 0 points are awarded for *Z<sub>yellow</sub>*.
- 2.2 1,000 points are awarded for *Z<sub>green</sub>* if all points of contact on the device reach the green zone. If they do not, 0 points are awarded for *Z<sub>green</sub>*.
- 2.3 *T<sub>red</sub>* is equal to the amount of time it takes the device to fully cross the red zone. The clock starts once any part of the device enters the red zone. The clock stops once the device has fully exited the red zone and entered the orange zone. This time is measured in seconds, down to an accuracy of 0.1 seconds.
- 2.4 In the event of a tie, the device with the lower mass will rank higher.

3

# THE COURSE



The course is made up of five (5) zones: the starting zone, the red zone, the orange zone, the yellow zone and the green zone.



# 3

## THE COURSE

- 3.1** The course is an L shape, contained within a 240 cm x 240 cm square (approximately 8 feet x 8 feet) and bordered on its outside edges by adhesive tape stuck to the floor. The floor surface for the provincials will be laminate floating floor. Adapting to the flooring used in the provincials is a part of the challenge. Please note that it is not clear how much space there will be around the outside of the course.
- 3.2** The border for each zone is the outer edge of the adhesive tape matching its zone colour.
- 3.3** The starting zone is 60 cm x 60 cm; the red zone is 60 cm x 100 cm; the orange zone is 60 cm x 80 cm; the yellow zone is 120 cm x 80 cm; and the green zone is 60 cm x 80 cm.
- 3.4** The starting zone has a vertical clearance of 100 cm, and all the other zones have a vertical clearance of 200 cm.



# 4

## DEFINITIONS

**4.1 Reservoir:** A clear two (2) litre plastic soda bottle with its original cap on, containing one (1) litre of liquid. The reservoir will be provided to teams at the provincials.

**4.2 Device:** Everything contained within the starting volume at the beginning of an official attempt, with the exception of the reservoir.



# 5

## RULES

A team may be disqualified, forfeit an official attempt or be stopped mid-attempt if they violate any of the following rules:

### The device

**5.1** The device, tools and other technical equipment must fit inside one or two paper storage boxes able to hold 5,000 sheets of 8.5 in. x 11 in. (21.6 cm x 27.9 cm) paper. The boxes must be able to close without bulging.

- 5.2** The device (not including reservoir) may not exceed **4.50 ± 0.01 kg** in mass.
- 5.3** Once the device has been activated, it must run autonomously.
- 5.4** The device may not separate into multiple pieces during official attempts.
- 5.5** When outside of the starting zone, the device must maintain at least one point of contact with the ground at all times, and all points of contact with the ground must remain entirely within the boundaries of the course. If this rule is violated, the official attempt will be halted, and all points scored before the end of the attempt will be counted based on the final zone reached.
- 5.6** While in operation, the device must not pose any danger to or risk damaging the course or the premises of the competition.

## **The reservoir**

- 5.7** Teams will be provided with a reservoir at the provincials. Only the provided reservoir may be used during official attempts.
- 5.8** The reservoir must be completely free from damage before and during official attempts. Reservoirs will be examined for damage after each attempt.
- 5.9** The water in the reservoir must remain liquid before and during official attempts.

**5.10** The reservoir may not, at any moment during an attempt, come into contact with the ground. If the reservoir comes into contact with the ground, the attempt will be halted, and a score will be awarded based on the final zone reached before the reservoir came into contact with the ground.

## **The energy source**

**5.11** To move your device, only energy from the unaltered springs of four (4) Victor® brand, model M150TRI mousetraps may be used. This energy can be converted into other forms of energy (mechanical, electrical, gravitational, etc.).

**5.12** Other sources of energy may be used for purposes other than moving the device.

**5.13** The energy from the device's activation may not be used to move the device.

**5.14** Combustion is prohibited for safety reasons.

## **Device activation**

**5.15** Before the start of an official attempt, only the device, reservoir and activation tool (if placed in the starting zone) should be in the starting zone. These items must be located entirely within the starting zone's volume and must be stationary. Members of the team must stand outside of the course and may not use their hands or tools to stabilize or hold the device.

- 5.16** The device must be activated using one hand in a single motion. A tool may be used to activate the device.
- 5.17** The starting zone must be empty once the device has exited it.

## 6

# PROCEDURE

The competition procedure is the same for both the *Amateur* and *Professional* categories.

### Device verification

- 6.1** Before the *Professional* and *Amateur* competitions, each team must have their device checked to ensure it complies with the rules and must explain how it operates to the panel of judges.

### Qualifying round

- 6.2** Competitors will go in an order drawn at random.
- 6.3** Once a team has been called, they will have five (5) minutes backstage to assemble and prepare their device. A table and an electrical outlet will be provided. The team will not yet have the reservoir at this point.

- 6.4** Once they have been called, the team will place their device and activation tool, if necessary, on the stage. They will have two (2) minutes to present their device to the audience.
- 6.5** The team will receive a reservoir, at which point they will have five (5) minutes to:
- Set up and prepare their device
  - Place the reservoir on the device
  - Make any unofficial attempts
  - Make their official attempts (a maximum of 2)
- 6.6** Once the team is ready to start an official attempt, the team's representative will inform the referee and the team will exit the course.
- 6.7** The referee will make sure that the course and device are both in order.
- 6.8** The referee will blow their whistle to announce the start of an official attempt. The team's representative may then activate the device. If the activation is unsuccessful, the representative may try again.
- 6.9** Once the device has come to a stop, or if a rule has been violated, the five (5) minutes have expired or the team's representative requests the test be halted, the referee will blow their whistle to signal the end of the official attempt. At this point, the clock will be stopped, and a score will be awarded based on the final zone reached at the moment of stoppage.

- 6.10** At the referee's signal, the team will approach the device, remove the reservoir and present it to the panel of judges. A judge will review the reservoir's condition. If it was damaged in the first attempt, a new reservoir in good condition will be provided to the team for their second attempt, and they will be awarded zero (0) points for their first attempt.
- 6.11** If the five (5) minutes have not expired, the timer will resume and the team may make any other unofficial attempts they wish, as well as a second official attempt.
- 6.12** The best result (P) from the two official attempts, if applicable, will be used for the rankings.

## **Final round**

- 6.13** The five teams with the best results will qualify for the final round.
- 6.14** Teams will compete in reverse order from their rankings in the qualifying round.
- 6.15** Teams will repeat the steps from the qualifying round, with the exception of presenting the device to the public.
- 6.16** In the final round, teams will be provided with a reservoir filled with a litre and a half (1.5 L) of water.
- 6.17** The team with the best result (P) in the final round will be the winner and will take home the Challenge Prize.

# PRIZES

*The following prizes will be awarded to the winners of the Professional category at the provincials.*

## Challenge prize

**\$1,000** awarded to each member of the team with the highest score. **Provided by the Ministère de l'Économie et de l'Innovation.**

**Free registration to the Forum international Sciences Société** for each member of the winning team, as well as reimbursement (up to \$100) of travel expenses. **Provided by Acfas.**

## Ingenuity prize

**\$1,000** awarded to the team whose original device really pushes the envelope without breaking any rules. **Provided by the Ordre des technologues professionnels du Québec (OTPQ).**

## Design prize

**\$1,000** awarded to the team that created a functional device with the most attractive design. **Provided by École de technologie supérieure (ÉTS).**

## Environmental responsibility prize

**\$1,000** awarded to the team that best applied ecodesign principles to minimize their device's environmental footprint. **Provided by Université du Québec à Montréal.**



### **Communications prize**

A **\$1,500 mobility grant** for a science trip to France for the Fête de la science in October 2022 or the equivalent in the event that health restrictions limit international travel. Awarded to each member of the team with exceptional communications (written and spoken). **Provided by Les Offices jeunesse internationaux du Québec (LOJIQ).**

### **Merit prize**

**\$1,000** awarded to the team that excelled in all five categories: device performance, ingenuity, design, environmental responsibility and communications. **Provided by the Fédération des cégeps.**

### **Woman in science prize**

**\$1,000** awarded to a woman whose passion for science stood out through her ideas set out in a short written form and her attitude at the provincial finals. **Provided by the Fonds de recherche du Québec – Nature et technologies (FRQNT).**

### **Jury selection prize**

**\$1,000** awarded to the team designated the winner by the jury. Evaluation criteria for this prize are up to the members of the jury. **Provided by the Trottier Family Foundation.**

### **Audience choice prize**

**\$1,000** awarded to the team designated the winner by a public vote. **Provided by Polytechnique Montréal.**

### Women's participation prize

**\$500** awarded to a student drawn at random from competitors in the locals in the *Professional* category. **Provided by the Ministère de l'Éducation and the Ministère de l'Enseignement supérieur.**

### Men's participation prize

**\$500** awarded to a student drawn at random from competitors in the locals in the *Professional* category. **Provided by the Ministère de l'Éducation and the Ministère de l'Enseignement supérieur.**

*Visit our website to learn more about the prize criteria.*

## SCHOLARSHIPS



**A \$1,500 scholarship** applicable to tuition fees provided by **Polytechnique Montréal.**

**A \$1,500 scholarship** applicable to tuition fees provided by **École de technologie supérieure (ÉTS).**

## YVON-FORTIN PRIZE

**Symbolic prize** awarded to the team that excelled in the *Amateur* category. **Provided by École nationale d'aérotechnique.**



# QUESTIONS

The FAQs on our website have more information regarding device requirements. If the FAQ page does not answer your questions, please contact us at [scienceontourne.com](http://scienceontourne.com).



# SAFETY

It is strongly recommended that you wear protective equipment, including glasses and gloves, when making your device and during the locals and provincials.



# THANK YOU TO OUR PARTNERS

## MAJOR PARTNERS

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