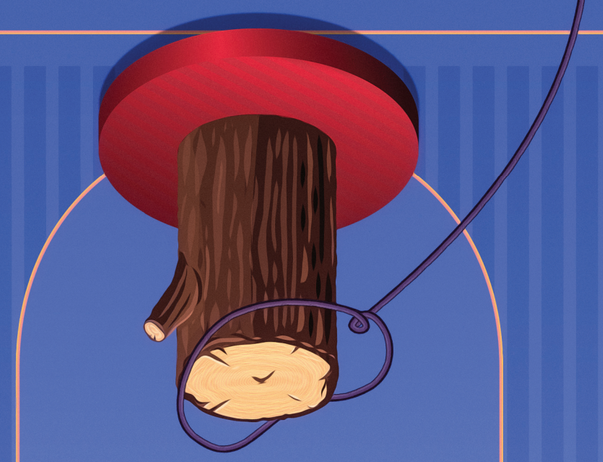

CHALLENGE

1

Build a device capable of retrieving three (3) wood logs as fast as possible using the energy stored in rubber bands.

THANK YOU TO OUR PARTNERS

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FOUNDATION FAMILIALE TROTTIER FAMILY FOUNDATION

CÉGEP DE RIVIÈRE-DU-LOUP

PROVINCIAL FINALS

Cégep de Rivière-du-Loup

May 5 & 6, 2023

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 & 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 13 to April 7, 2023. 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 *Cégep de Rivière-du-Loup* on May 5 and 6, 2023.

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.

2. Scoring

$$P = \frac{D_{delivery} \times D_{device} \times N}{30}$$

2.1. $D_{delivery}$ is the shortest distance when the challenge starts between the location of the logs and the delivery zone. This distance is measured in centimetres, rounded to the nearest centimetre.

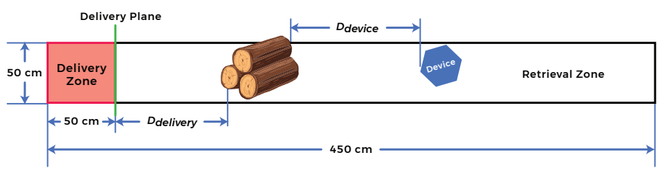
2.2. D_{device} is the shortest distance when the challenge starts between the location of the logs and the device. This distance is measured in centimetres, rounded to the nearest centimetre.

2.3. ***N*** is the number of logs moved into the delivery zone. A log is deemed to be in the delivery zone if, at the end of the official attempt, it has fully crossed the delivery plane, is stationary, and is located at least partially within the volume of the delivery zone.

2.4. In the event of a tie, the device with the lower mass will rank higher.

3. The Course

The course has two (2) zones: the delivery zone and the retrieval zone, which are separated by the delivery plane.



3.1. The course is a 450 cm x 50 cm rectangle. The ground border of the course is the outside edge of the adhesive tape on the flooring. 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 delivery zone is 50 cm x 50 cm. The ground border of the zone is the outside edge of the adhesive tape. The delivery zone has a vertical clearance of 100 cm.

3.3. The retrieval zone has a vertical clearance of 200 cm.

3.4. The delivery plane is a vertical plane overtop of the line separating the delivery zone from the retrieval zone.

3.5. Participating teams will place their device in the location of their choice on the course and will place the logs in the location of their choice in the retrieval zone.

4. Definitions

4.1. **Log :** A wood dowel 2.5 cm in diameter and 30 cm in length.\

4.2. **Device :** A mechanical apparatus that retrieves logs. At the start of an official attempt, everything on the course is considered part of the device, with the exception of the logs and the activation tool.

4.3. **Activation tool :** An instrument used for activation. The tool can be:

- In a participant's hand, outside of the course
- Stationary on the course, holding the device

Use of an activation tool is optional.

5. Safety

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

6. 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.**

7. 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

7.1. 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.

7.2. The device (not including reservoir) may not exceed 4,50 ± 0,01 kg in mass.

7.3. Once the device has been activated, it must run autonomously.

7.4. The device may not separate into multiple pieces during official attempts.

7.5. While in operation, the device must not pose any danger to or risk damaging the course or the premises of the competition.

Energy source

7.6. The only energy participants may use to retrieve the logs is the energy derived from ten (10) #84 rubber bands (3.5 in. long and 0.5 in. wide) or twenty (20) #64 rubber bands (3.5. in. long and 0.25 in. wide). This energy can be converted into other forms of energy (mechanical, electrical, gravitational, etc.).

7.7. Other sources of energy may be used for purposes other than controlling the device. These sources cannot provide the energy used to move the device or logs.

7.8. Combustion is prohibited for safety reasons.

Device activation

7.9. 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.

7.10. The device must be activated using one hand in a single motion. A tool may be used to activate the device.

About the wood logs

7.11. At the start of an official attempt, the logs must be stationary and located entirely within the volume of the retrieval zone. The logs cannot be touching the device.

8. Qualifying Round

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

Device verification

8.1. 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

8.2. Competitors will go in an order drawn at random.

8.3. 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 access to the logs.

8.4. 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.

8.5. The team will receive the three (3) logs, at which point they will have five (5) minutes to:

- Set up and prepare their device
- Place the logs in the desired location
- Make any unofficial attempts
- Make their official attempts (a maximum of 2)

8.6. 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.

8.7. The referee will make sure that the course and device are both in order and will measure the $D_{delivery}$ and D_{engin} distances.

8.8. 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 with the referee's approval.

8.9. At any time during an official attempt, the team's representative can ask the referee to end the official attempt. A score will then be awarded based on the number of logs retrieved from the delivery zone at that point in time.

8.10. 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.

8.11. The best result (P) from the two official attempts, if applicable, will be used for the rankings.

Final round

8.12. The five teams with the best results will qualify for the final round.

8.13. Teams will compete in reverse order from their rankings in the qualifying round.

8.14. Teams will repeat the steps from the qualifying round, with the exception of presenting the device to the public.

8.15. For the final round, the team will retrieve six (6) logs.

8.16. 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 2023 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.**

Anniversary prize

$1,000 given to the team that best exemplifies the spirit of the contest. The criteria for this prize will be revealed at the 2023 winter session. **Provided by the Université du Québec à Rimouski.**

Murphy Prize

A symbolic prize awarded by the Cégep de Rivière-du-Loup to a team whose device did not work as it was intended to.

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'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'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 Cégep de Rivière-du-Loup.**